OCTOBER 1975

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Computer Decisions

DEPARTMENTS

2 **Undercurrents**
Catamore case wrongly decided?

6 **Newsdata**
Telex drops IBM suit

8 **Washington Datalink**
Bank failure warning system

12 Minicomputers: **Small World**
Something is a myth

14 Software: **Runs for Your Money**
Calling all maintenance men

16 Technology: **Inside Story**
Minis, micros find new jobs

64 **Advertiser's Index**

NEW DEVELOPMENTS

52 **Spotlight**
Crt data station

54 **Peripherals**
Programmable ticket printer

56 **Software**
Disk file usage

57 **Data Communications**
Remote system has 32k memory

Cover: A passel of problems were solved by this leasing company's inhouse mini. The old budget was left in a cloud of dust and a hearty "Hiyo software!" Thank you, masked mini.
Illustration by Dan Kainen.

FEATURES

18 HISTORY/**Leibniz and Pascal**
Mechanical calculators were just the beginning of the many contributions of these two 17th-century geniuses. Here's a look into their life and times.
Dr. Molly Gleiser

24 MINICOMPUTERS/**The mini adventures of the loan arranger**
Saddled with service bureau bills, this leasing company rounded-up a mini to ride herd on its financial chores.
Grant Campbell

30 BANKING/**EFT and crime**
Banking's new technology has given us a new kind of criminal. SRI's Donn Parker—a new kind of G-man—wants the collar.
Linda Flato

34 VIEWPOINT/**Richard Bach's knight to remember**
Richard Bach—father of Jonathan Livingston Seagull—ran up against a chess-playing computer recently. Here's his first-person account of a hot night at a terminal.
Richard Bach

36 DATA COMMUNICATIONS/**Modems and multiplexers**
If your lines are busy, you may be in need of new data communications hardware. Know what you're buying before you go for it hook, line and bisyncher.
David Axner

44 MANAGEMENT/**A manager looks at system design**
And finds that many projects get off on the wrong foot and end up costing more than they should.
Raymond J. Epich

50 **Computer Decision's Editorial Survey**
The editors of Computer Decisions want to know what you think of the publication. Take a few minutes to complete the questionnaire.

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Undercurrents

A POS ability for Hewlett-Packard?

A hardware store in the midwest and a glass goods retailer in southern California are using HP programmable calculators as point of sale units. And jawing between the glass people and HP about a POS calculator franchise is ongoing on a very low level. The glass store at South Coast Plaza in California's Orange County has used a 9821 and is expected to switch to a 9815 to log inventory records, employee data, cash and the rest of the little things retailers like to track. An interface to a cash drawer is under construction. A similar job on a 9815 is being run—successfully so far—in Michigan at a hardware outlet. More sites are rumored, but everything is hush hush so far because Hewlett Packard isn't quite certain what to make of all this (potentially lucrative) business yet.

General Automation's Info booth was bugged

It's tough to run an exhibit in New York, and at trade shows the competition can be extra tricky. So when General Automation discovered their booth was bugged as they folded things up, you can be sure they were upset. The bugging wasn't a nefarious plot by some jealous rival, however. It's just the way New York treats California hotshots. And sources inside the company confirm that all of the roaches found in packing crates were evicted before the computers were returned to sunny Anaheim.

Catamore case wrongly decided?

Catamore Enterprises' legal victory in its countersuit against IBM may have set visions of class action suits dancing in the heads of disgruntled users around the country. But one Wall Street legal type thinks that all the excitement is a little premature. Cal Crary, a lawyer and editor of the litigation bulletin from the securities firm of Wood Walker, thinks that the jury verdict will be set aside or "significantly modified." IBM has asked for judgment in its favor or for a new trial. In either event, it wants a reduction in the amount of damages to be paid to Catamore. The size of the damages, Crary points out, is especially annoying, since IBM believes the jury was not able to decide clearly on the amount because the damage claims were so confusingly presented. In fact, Crary says, the jury compensated Catamore twice for several items. So-called "duplicative awards" are improper and the jury has been so instructed by the judge. Yet Crary points out "It is evident . . . that the jury was unable to follow this particular instruction." A permissive judge who allowed a "confusing picture" to be presented to the jury and who failed to define in his charge to the jury the specific questions it had to decide, Crary indicates, makes the jury verdict insupportable. "The proper disposition of the case would be to order a new trial," he says. Such a decision would vindicate IBM, give Catamore a chance to recover damages on a proper legal theory, and erase the errors of the original trial, creating a favorable climate for a settlement. Whatever happens, Crary expects a decision within the month.

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GENERAL AUTOMATION

Newsdata

Telex drops IBM suit; no dough to go

Telex Corp. has withdrawn its appeal of its antitrust case against IBM. In a surprise out-of-court settlement announced Oct. 3, the two companies said all litigation will be dropped and no payment will be made by either firm. Telex faced an $18.5 million fine awarded to IBM in IBM's counterclaim of industrial espionage, a fine Telex acknowledged it could not pay.

Telex had petitioned the Supreme Court and expected to hear on Oct. 6 whether or not the court would review the case. Many industry observers thought a Supreme Court review was unlikely.

The orignal suit was filed in April, 1973, in Tulsa, OK. In IBM's first major legal setback, Judge A. Sherman Christensen found in favor of Telex, and awarded the peripherals maker treble damages in the amount of $352.5 million. Telex was found guilty of stealing IBM trade secrets and fined $21.9 million.

Denver reversal

In January of this year, a federal appeals court in Denver overturned Christensen's decision. It upheld the theft of trade secrets ruling against Telex, but reduced the damages to the $18.5 million Telex was unable to pay.

Telex president Stephen Jatras said that the company considered all possible outcomes of a Supreme Court review and decided that terminating the litigation was in the best interests of his company's customers, employees, stockholders and debenture holders. Without the suit, Telex can now devote its efforts to business operations, Jatras said.

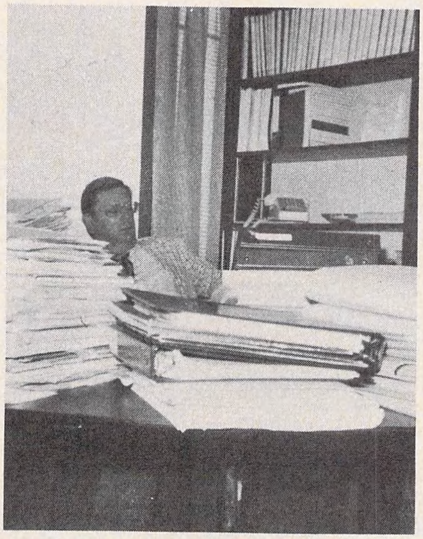
Other companies waiting to go to trial against IBM said that their cases would be affected little by the settlement since their suits differ enough from Telex's.

Just what the impact Telex's withdrawal will have on the Justice Dept.'s case is not clear. Gene Collins, a securities analyst with Evans & Co., thinks that the settlement is likely to help the government's case. Similarly, Cal Crary, of Wood Walker, thinks the government's case will be helped because—in view of the fact that IBM and the government have stipulated the Telex record—the settlement leaves the possiblity that the appeals court decision was incorrect, an unlikely event had Telex's writ of certiorari been denied by the Supreme Court.

But Harry Edelson, of Drexel, Burham & Co., thinks that the settlement will be detrimental to the private cases as well as the government's case.

CIA responds to IBM subpoena

Two days after the fateful Ides of September, a bunch of IBM legal henchmen trouped into the Computer Industry Association's Rosslyn, VA, headquarters. In response to an August 18 subpoena, the association was dutifully rendering unto IBM the contents of its telltale files.



Biddle in the middle

Arriving around 9 A.M., lawyers from the Phoenix firm of Brown & Bain were given a whirlwind tour of the office by CIA president Jack Biddle. Impressed by the group's efficient document operation, one of the B&B legal eagles commented, "You've got quite an investment here."

Amicably chit-chatting, Biddle, accompanied by his legal advisors Jack Pierce and Terry Mahn, handed over the requested documents to B&Bers Terry Fenzl, Jack Bloomenstein and Jack E. Brown. Also on hand for the peekaboo proceeding was Charles Hamilton, a Justice Department observer. Adding a little levity to the auspicious occasion, a business-like Fullerbrush man also arrived on the scene. Mistaking him for a lawyer, CIA personnel almost ushered him into the parley room.

CIA staffers, anxious to please the IBM entourage, hospitably served brimming cups of hot coffee. Unprepared for such a warm welcome, Bloomenstein declared, "You're trying to love us to death. It's unnerving."

Later on in the morning, a pair of local IBM microfilmers strolled in. The duo spent two days at the Rosslyn campsite copying various CIA documents. The material consisted mainly of CIA membership data, bylaws, speeches, board meeting proceedings and Justice Dept. correspondence.

But why does IBM want this kind of information? Biddle believes this is just part of the mighty corporation's "game plan" to revoke the "gag order" in the U.S. V. IBM case.

Originally imposed at IBM's request, Pre-Trial Order No. 4 has been in effect since May 1972. Now in an interesting turnabout, IBM has apparently decided to try and get the gag order stripped away.

According to Biddle, IBM wants to use the CIA "as their excuse while in actuality they are playing for much bigger stakes." If the order is repealed, he claimed IBM would "attempt to circumvent both the law and the courts by applying pressure on the Administration and the Congress through a well orchestrated public relations, media and lobbying campaign."

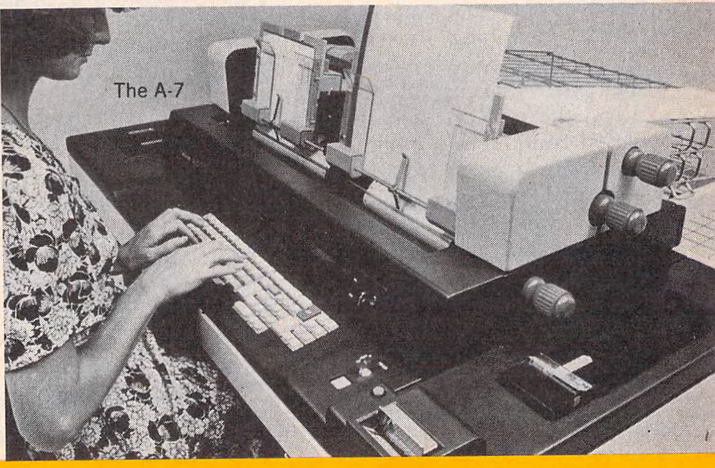
Bankers face consumer needs at EFTS fete

Bankers know what side their bread is buttered on. It's the consumer who brings in their bacon. No one is more aware of this than banking policy makers who turned out in force in

continues on page fifty-eight . . .

The TC-800

The A-5



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INFORMATION RETRIEVAL NUMBER 7

Washington datalink

by Linda Flato

Warning system may help prevent bank failures

The Comptroller of the Currency, struggling to keep his far-flung network of national banks on the right track, is hoping to get some help from a new computerized early warning system. Using this watchdog system, the federal banking regulator could continuously monitor his banks for early signs of trouble.

The system, called the National Bank Surveillance System (NBSS), was originally proposed in a study released in mid-August by the accounting firm of Haskins & Sells. In that $1 million study, the Comptroller was urged to revamp many of his operations to avoid such spectacular banking failures as the 1973 demise of Franklin National.

The H&S report explained that "the Comptroller requires a system that will alert him on a more timely basis to deteriorating conditions in individual banks or in the national banking system as a whole. This appears to be particularly pertinent," the report noted, "in these times of banks' reliance on highly volatile funds and their involvement in relatively high risk activities."

Aimed primarily at larger banks with assets of over $500 million, the NBSS would do its monitoring through a complex set of financial and nonfinancial data supplied by banks. This information would then be used to evaluate them in such areas as soundness of policies, quality of assets, liquidity, etc.

The $1.5 million system, which will be designed by H&S, is expected to be operational in a year and a half.

FCC interconnect plan opposed by IBM, AT&T

Great corporate minds frequently think alike, especially when it's to their advantage. And that's exactly what happened earlier this summer, when the business behemoths of IBM and AT&T joined forces to protest a liberalized interconnection plan offered by the FCC.

Ma Bell was first to speak its piece in a July 21 filing with the regulatory commission. Following up its earlier comments, AT&T claimed that the interconnection proposal was "not in the public interest" because it would mean higher costs for all phone users.

The controversial plan, based on an earlier report by the FCC's Office of Chief Engineer, was drawn up by a joint FCC board with some help from state regulatory officials. Under the proposal, data communications and other telecommunications gear would be certified or registered safe for use on the phone network.

Network damage

Ma Bell isn't happy with this new plan and warned the commission that it could cause serious "deterioration of all customer services." According to Bell, "such uncontrolled connections could damage the network and threaten the safety of telephone company personnel." Before it okays any registration or certification arrangement, AT&T urged, the FCC should look into what effect further competition in the telecommunications field would have on the cost and quality of phone service.

As an alternative to this proposal, AT&T suggested a "simpler" approach, which would allow customers to use their own gear in conjunction with a built-in protective device. This protective module, it argued, would "achieve protection by establishing a standard interface design for each class of ancillary and data equipment." Independent equipment manufacturers, it explained, would be free to design their gear any way they want as long as it meets certain criteria and the safety circuit is between the device and the network.

IBM agrees

IBM seems to agree with AT&T's recommendations and offered a similar interconnection option in its August filing with the FCC. In urging the commission to reject the current plan, the mighty mainframer contended that "the registration of interconnection devices by the FCC . . . involves an unnecessary degree of government regulation."

IBM is particularly concerned that the joint board registration plan will not work for dp systems. The company charged that many of the proposal's stipulations were "drafted with only simple devices in mind." This failure to recognize the differences between simple devices and complex equipment such as computers makes much of the "testing, documentation and labeling unsuitable for the complex devices," the company claimed.

Under the IBM alternative, authorized connecting-protective modules (ACPM) would replace the presently required data access arrangement. These ACPM's would be designed by Bell and manufactured by independents under license from Bell. IBM called this manufacturer certification program a "simpler and less costly" approach which it claimed would adequately protect phone system integrity and network service quality.

Udall proposes computer competition commission

Rep. Morris K. Udall (D-AZ) is facing stiff competition in the race for the Democratic Presidential nomination. But tough competition has never bothered the 53-year-old Arizona legislator. An ardent believer in the power of competition, Udall has proposed legislation to create a "Competition Review Commission" which would scrutinize the competitive status of the computer, communications and other industry sectors.

Udall's bill, announced in late July, would set up a supervisory commission to review "all laws, regulatory activities and government practices that affect competition." The commission would also conduct an industry-by-industry study to "determine the extent of concentration of eco-

continues on page ten . . .

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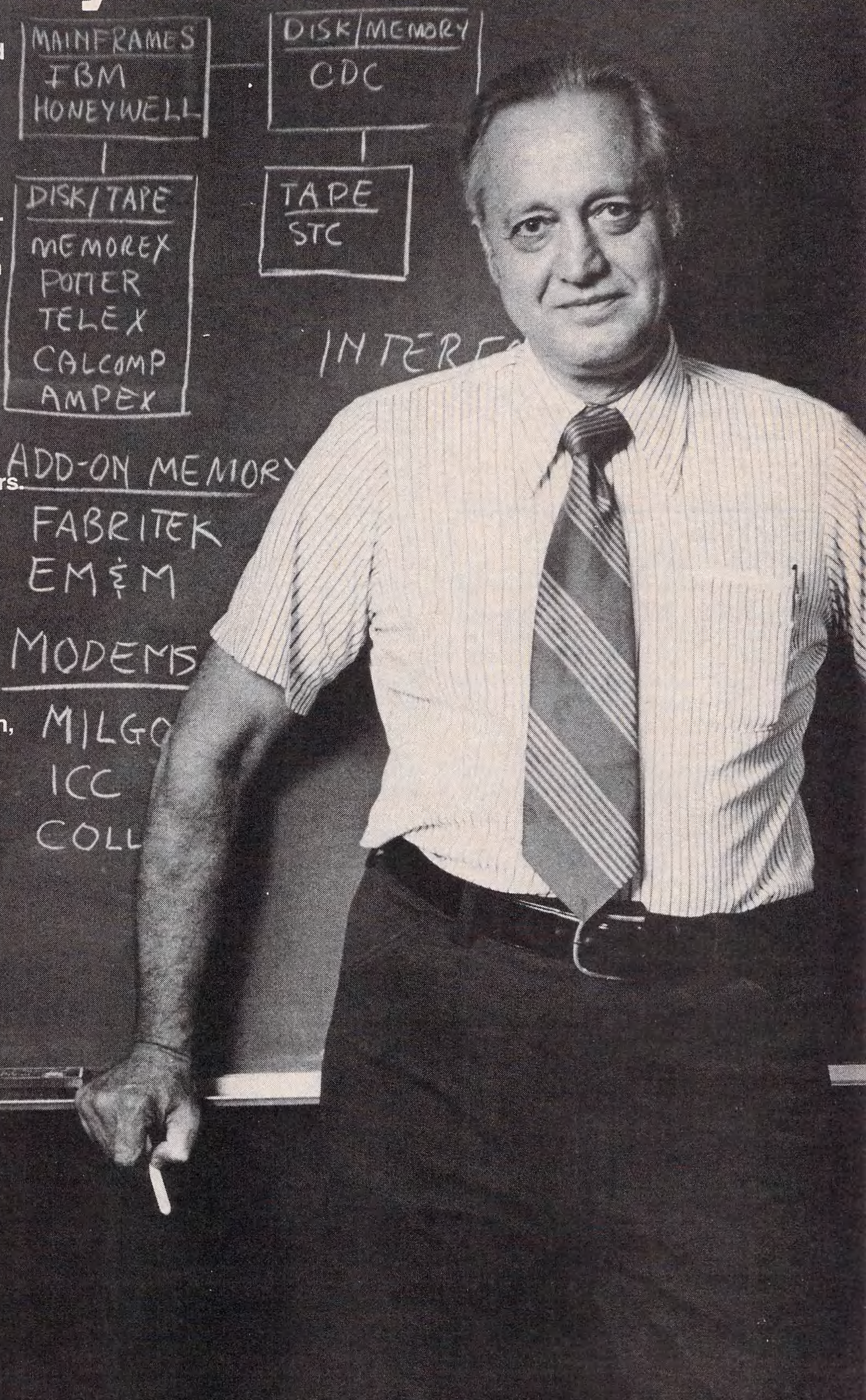
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INFORMATION RETRIEVAL NUMBER 9

Washington datalink

continued from page eight

nomic power in those industries and the effect of that concentration on prices, profits, inflation and employment." After this in-depth examination was completed, the group would make recommendations to try to spur competition in the ailing industry. Udall explained that these "remedies should be tailored to meet the specific problems." These cure-alls could include subsidies for new competitors or changes in Uncle Sam's procurement practices.

Udall is critical of past legislative efforts to reorganize these concentrated market sectors. Legislation in this area, he charged, has been "a sporadic, patchwork, ad hoc effort, with few concrete results." He claimed that his proposed commission would offer a more comprehensive approach to the problem by evaluating such factors as the regulatory structure, antitrust, patent, copyright and tax laws, the National Labor Relations Act and all applicable government practices.

Brooks joins opposition to FEA's dp contract

The Federal Energy Administration has had nothing but trouble with its ill-fated dp deal with Optimum Systems Inc. The beleaguered agency has been the target of Congressional criticism ever since the $7.7 million contract was awarded last fall. To make matters worse, the powerful chairman of the House Government Operations Committee, Rep. Jack Brooks (D-TX), joined the fray in August. In a sharply worded statement, Brooks demanded that the FEA drop the controversial contract because of the lack of data security safeguards.

Trouble over the computer contract began brewing back in December. At a hearing on FEA oil pricing regulations, Sen. Abraham A. Ribicoff (D-CT) questioned the propriety of the OSI award and asked the agency for a detailed explanation. Ribicoff expressed concern that the firm, headed by multimillionaire Texas oil magnate Clint W. Murchison Jr., could use the dp setup to steal a peak at the proprietary data of other oil companies.

Statistics collector

Under the two-part facilities management contract, OSI was to install and operate a nationwide real-time system for the FEA. When fully operational, the system would collect oil industry statistics on inventories, production and reserves. The contract covered six months, the rest of FY 1975, with a renewal option for FY 1976.

Six firms bid on the contract when a request for proposals (RFP) was issued last September. Three of the disgruntled losers, Planning Research Corp., On-Line Systems Inc. and Remote Computing Corp., filed their gripes with the General Accounting Office over the OSI award.

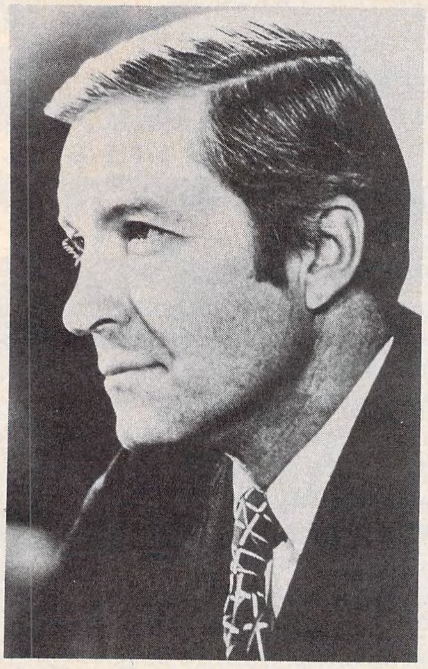
In late July, the GAO rejected these protests and recommended that work under the OSI contract continue. A termination of the deal at this late date, they pointed out, would be both costly and disruptive to the FEA.

But Congress doesn't seem to agree with the GAO findings. Key members of the House Government Activities Subcommittee have argued that the FEA procurement violated the Brooks Act, which requires agencies to get the final go-ahead on adp buys from the General Services Administration. The GAO confirmed that this was done. "The validity of the award was not affected," the GAO explained, "by the Brooks Act and implementing regulations because FEA was entitled to rely on GSA's and the Office of Management and Budget's authorizations to proceed with the procurement."

Another hurdle

With the GAO protests finally resolved, the FEA still has another major hurdle to overcome in the contract dispute. The Congressional monkey on the agency's back is still Brooks. The vigilant computer watcher seems determined to scuttle the OSI deal. Concerned over potential privacy problems, Brooks charged that the system "could make it impossible for the FEA to carry out its role effectively by undermining the oil industry's willingness to provide sensitive information." He claimed that the contract "not only jeopardizes our nation's effort to deal with the energy problem, but it also undermines the federal procurement process."

The fate of the troublesome OSI contract is now in the hands of the House Conservation, Energy and Natural Resources Subcommittee. If the subcommittee decides the contract should be cancelled, the FEA may have to begin from scratch and go through the arduous process of developing a new RFP and soliciting bids. But FEA officials are confident that their efforts will be vindicated, and that ultimately the controversial system will win a Congressional stamp of approval.



Streamliner Percy

Senate again okays adp procurement bill

It was a classic case of Congressional *déjà vu* in late July, when the Senate once again okayed a bill to streamline federal dp procurement practices. The original bill (S. 2785), introduced by Sen. Charles H. Percy (R-IL), passed the Senate last December but floundered when it reached the House earlier this year. On the second time around, the measure was taken up by the House Government Operations Committee, with final passage expected late this fall.

The recycled legislation (S. 1260) would save taxpayers an estimated $35 to $100 million annually by allowing the government to enter into longer leases for data processing gear. Under the bill's provisions, the General Service Administration could sign multi-year contracts which would enable Uncle Sam to take advantage of lower prices offered under long-term leases.

The measure specifically authorizes GSA to enter multi-year agreements that exceed the money in its rotating adp fund. The amount of unfunded contracts, however, would be limited by Congressional handouts. The bill gives GSA further leeway by allowing the agency to convert a large portion of the government's present computer inventory to multi-year deals under new contracts. ☐

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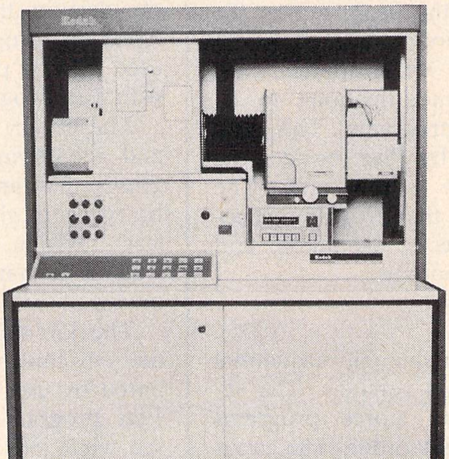

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INFORMATION RETRIEVAL NUMBER 13

Runs for your money

by Leslie Frances

Calling all maintenance men

Software systems rarely remain stagnant. For every tax change or every new product added to a company line, one or more programming changes is made. To help such dynamic operations, several source program maintenance packages are available.

One such program is *Plus* (*Program Library Utility System*) from Cullinane Corp. in Boston, MA. This system uses programmer-supplied card decks as input. Modifications can be made to existing production programs and new ones can be inserted into the source program library. The system updates and maintains *Cobol, Fortran, PL/1* and *Assembler* programs, test data, etc. on a tape or disk library.

Plus operates completely under the control of the programmer. To use *Plus,* the programmer prepares punched cards which indicate all changes and modifications to be made to the programs. The only input required by *Plus,* besides the changes, is an action card. The card identifies the program, specifies the actions to be taken, and indicates any options.

Two versions

Plus is available in sequential and direct access versions. The sequential version stores programs on file in a strict order. The input created by the programmers must be organized in that order before it can be batched. The direct access version is designed for large program libraries where only a small percentage of the programs are accessed at a time. This version includes special data compression features along with a method to reuse old program areas to conserve disk space.

Plus produces three reports, an updated library, copies of specific programs on cards, tape, or printer, and a job stream for compilations and program executions.

The three reports are a change report, a library index, and a job scheduler. The change report shows the exact instructions that have been received for each modification, including a summary of which listings were prepared and whether or not a jobstream was created. It automatically updates the program modification number used each time a change is made and notes the date of the modification. This report is program-oriented and is used by the programmer and filed with the program documentation.

The library index lists the names and identifying data for all programs that are in the program library, and gives the date of the last revision, modifications, etc. This is a handy report for a dp manager.

The job scheduler is a listing of the job control cards that are prepared by users or generated by the *Plus* program. It lets an operator see what jobs are to be run. Console messages to be displayed can be included with the control cards supplied by the user.

Because maintenance can be done to test decks and source programs simultaneously, a full program can be tested whenever modification is made to it without forcing the user to reassemble the original test material.

Not Marian?

Another East Coast software supplier, Applied Data Research, Inc. of Princeton, NJ, has a program called *The Librarian.* This package maintains and controls source program libraries on tape or disk. It can maintain a library containing any combination of programs and data as long as it was originally in 80-column card image format.

Twelve *Librarian* control cards modify or retrieve any source program. Each programmer produces his own card input. The card deck is then combined with others and run against the library. In order to modify a program already in the library, the programmer uses specific control cards with parameters that specify the sequence number of the statement after which the insert is to be made, or the sequence number of the first and last statements to be made based on data card sequence numbers.

In addition to modifying the program, a programmer can also document the modification as desired. The documentation can be a listing of the program or it can be a deck of punched cards. The programmer must specify his output requirements if they differ from the standard documentation produced for each run.

The Librarian features automatic safeguards against changing the wrong program. One feature is a password facility which is basically a protection against keypunch errors. It prevents a keypunch error from causing damage to a program module; security is also provided by an encoded software lock.

What a card!

The Librarian produces several levels of documentation designed for immediate reference purposes. The reports include a summary of activity, an update record, a master file index listing and a module listing. The summary of activity lists the name of each module selected for updating, listing or any other purpose during *Librarian* run. The listing notes whether the programmer's instructions are correct. If an error occurs, no changes are made to the particular module involved. Operations on all other modules, if correctly specified are performed.

The update record lists all instructions supplied by the programmer, all cards that have been inserted, deleted, or replaced, and any errors that were found as well as their causes and the action taken. It also contains comments from the programmer. Its ability to include commentary on a specific change is useful.

The Librarian provides historical documentation via history cards and comment cards. Any comments included on a history card are permanently stored on a master file. The explanations or descriptive information on a comment card appear only on the update record produced for a particular run.

The master file index listing contains details of each module updated plus an audit trail. It also lists the vital statistics of the program, including its name, date added to the library, number of cards involved, programmer responsible, the data set used, and the job name. The print listings stored in the library are also itemized. The master file index listing can be used for record purposes or for posting on a bulletin board as a programmer reference to insure that the program being used it up-to-date.

The last report, called the module listing, features a complete list of all cards comprising a module, together with the date each card was last modified. If there is no date, it is understood that the card was part of the original module and has never been changed.

MRS demeanor

One of the most extensive maintenance packages is the *System 2000* from MRS Systems in Austin, TX. *System 2000* is really a data base management system. It includes a basic module and options. The basic module defines, creates and maintains direct access files and retrieves data from them. The information storage and retrieval capabilities of the system can be used by nonprogrammers to query and update the data base and generate reports.

Any potential user should evaluate as many maintenance and retrieval packages as possible. Only the customer knows how much maintenance he will need for his particular organization, and almost every installation requires some. □

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INFORMATION RETRIEVAL NUMBER 14

Inside story

It's in the stars: Minis, micros finding new jobs

The downward trend in the price of mini- and microcomputers is causing them to crop up in applications where they would never have been found before. From scoreboards in sports stadiums to computer-generated horoscopes, minis and micros are finding new uses.

One of the most sophisticated electronic scoreboards around is the one in the Erie County (NY) Stadium, the home of the Buffalo Bills football team. The system uses a Computer Automation Alpha 16 mini with 24k of memory. Like most scoreboards, it can display messages. But the computer adds a way to show video images as well.

Any tv signal—whether it comes from a portable camera, tape recorder or tv network—can be fed into the system. The computer then digitizes the video signal and displays it on an 80-by-120 matrix of incandescent lamps. The final picture presented by this system is 27 feet high and 47 feet wide!

If sports aren't your thing, you can find minis in astrology. Companies such as Astro Computing Services of Pelham, NY are now using minicomputers to perform calculations of the orbital positions of the sun, moon and planets along with other astrological data such as nodes, planetary distances and daily motion. The results of these calculations, which are often available in both graphic and printed report form, are then interpreted by an astrologer.

Computers dispatch firemen, police

In a more serious vein, dedicated computers are promoting public safety in such areas as law enforcement and firefighting by dispatching police and firemen more rapidly and accurately than could be done manually.

In Citrus Heights, a suburb of Sacramento, CA, firemen are sent to a fire by a now-classic Xerox 530 computer. The 530 dispatching system uses 32k words of core memory and 24.5 million bytes of disk storage.

When a report of a fire is received, the dispatcher types in its street address which is immediately displayed on a crt screen so that it can be verified. The computer then takes the information and searches through memory to pull out all the facts necessary to send firefighting units to the scene. Among the data supplied by the computer are the nearest cross street, the availability of fire hydrants and incidental facts such as who should be contacted for the key to a specific building. These data are sent to the appropriate fire stations where they are printed out on a mobile printer.

Before the computer system was installed, a dispatcher had to look up all the information in card files.

The computer talks back

To help bankers work more efficiently, system designers have come up with systems that talk back to the user. Besides making man-machine interface easier, the talking computer has a big advantage to its user: it eliminates the need for costly, space consuming data terminals. The reason is that Touch-Tone telephones can be used to access information.

There are several systems of this type available. Some use prerecorded tapes that play whole messages, while others use tape or disk memories to store individual words or phrases. The desired output in these systems is synthesized under computer control.

One such system stores phrases on a 63 track drum memory. It is used by the EDP Corp. of Detroit. The brain of the system is a Honeywell 3200 computer. In operation, tellers call the computer and then, using the Touch-Tone keyboard, identify the bank or credit union that is calling, and note the type of transaction to be made and to which account. The computer responds with a vocabulary that is designed to handle withdrawals, payoffs, account information and fast cash, credit and management reports.

For example, if a teller is processing a withdrawal, the computer tells him how much money is in the account. And, if programmed to do so, the system will subtract any minimum balance that must remain in the account and will inform the teller of the maximum amount of money that may be withdrawn.

Another big application that has been heralded as a giant step forward while being cautiously eyed by consumers is the point of sale terminal. These units, which are glorified electronic cash registers, contain a microprocessor that performs all of the necessary calculations.

Using a POS terminal, a cashier enters a code number for the article being purchased either manually or via an optical reader. The micro then searches a central memory for that code number and retrieves the price that is stored in memory. Store owners claim that it can speed checkouts by as much as 50 percent as well as keep track of inventory, ordering and a host of other chores. But consumers are worried that since the price will be stored in the computer memory increases can be easily implemented without customers' knowledge and comparison shopping will be almost impossible.

The jury is still out on that one, but POS installations do seem to be making headway. *—JHG*

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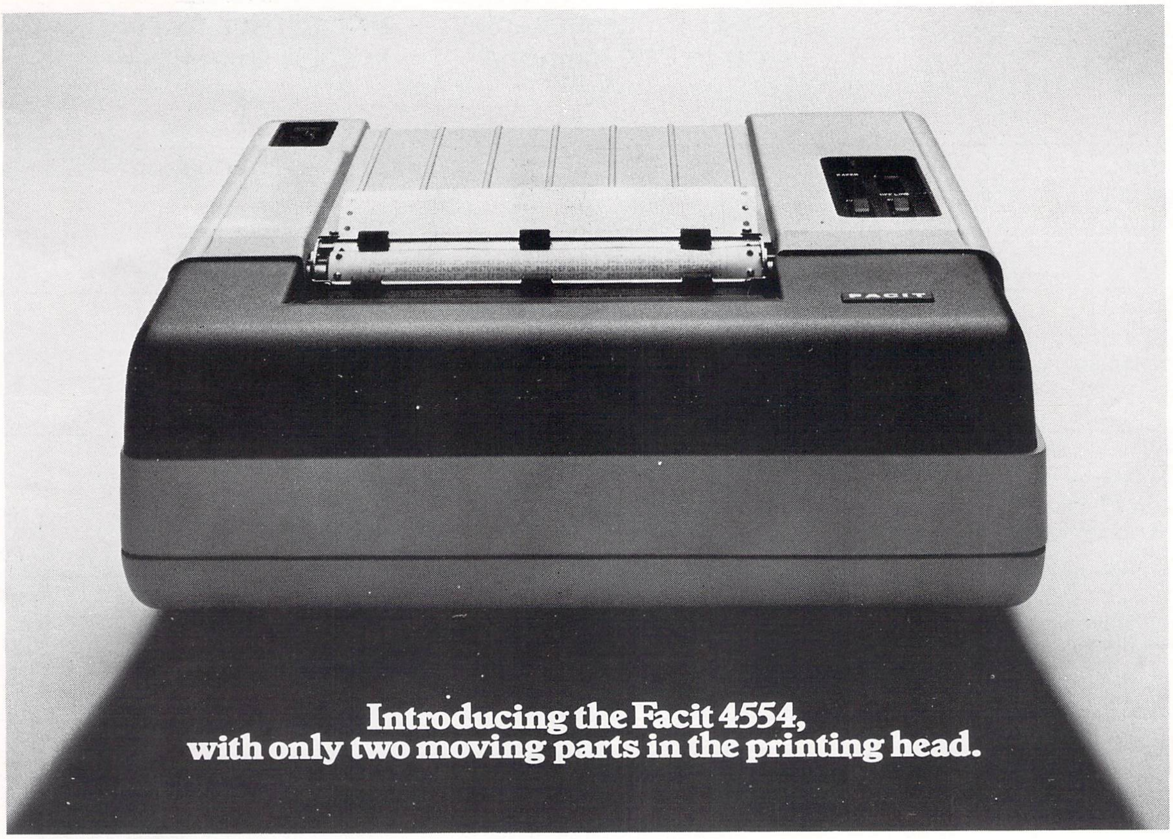

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INFORMATION RETRIEVAL NUMBER 15

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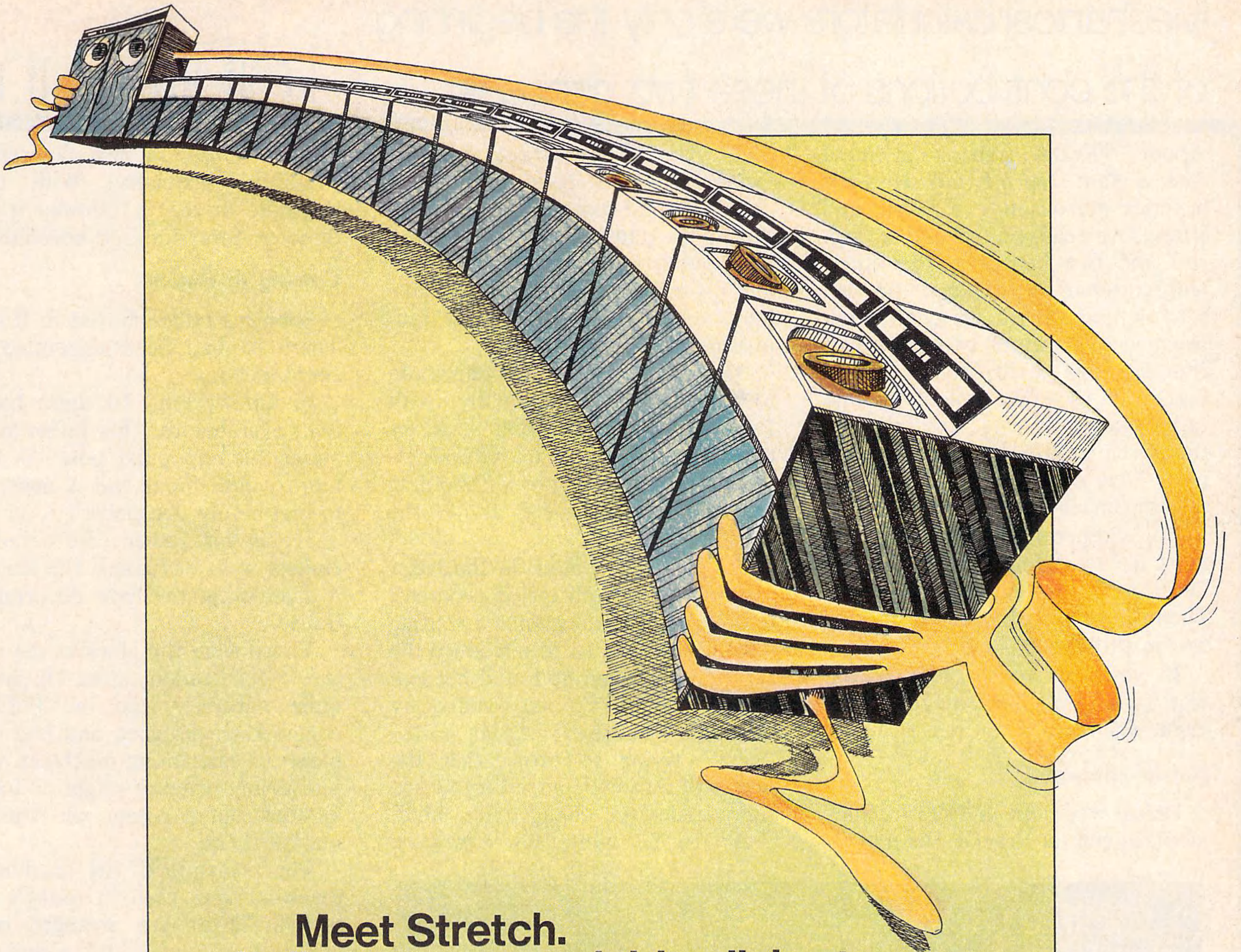

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INFORMATION RETRIEVAL NUMBER 17

Mechanical calculators were only the beginning of the contributions of these two geniuses.

Leibniz and

About 2600 B.C. someone in China took a giant step forward. He built a series of rods into a frame and strung five beads on one end of each rod and two beads on the other, with a separator to keep the two sets of beads apart. He could keep track in this way of two groups of five with two beads. This, the abacus, was the first calculator. So rapidly could this machine calculate that even in the 20th century experts have outstripped modern calculating machines.

For another 4,000 years, only the most feeble attempts were made to develop a mechanical calculator. Then Blaise Pascal turned his genius to the problem.

If you ask today who Pascal was, you are likely to get only vague answers.

Raisin' the son

Pascal was born in 1623 in Clermont, in central France. His mother died when he was three, and his father, who must have been an incredibly child-centered man, abandoned his career as a lawyer and high public official to raise Blaise and his equally talented sisters, Gilberte, three years older, and Jacqueline, the baby.

The Pascal children's education took place quite informally, with Papa Pascal introducting such interesting topics as the natural effects of gunpowder but withholding subjects he felt were above the boys' head.

He considered math in the latter category (it was all called geometry in those days), and intended waiting until Blaise was 16 to introduce the subject. But when he found his son, at the age of 12, surrounded by diagrams whose lines he called "bars," trying to prove that the angles of a triangle added up to two right angles, he changed his mind.

At 16 he wrote his *Essay on Conic Sections,* a new theorem in projective geometry. With inexhaustible drive, he followed it with three or four hundred corollaries.

Coming to Rouen

Soon his father moved to Rouen, where he had been appointed tax commissioner.

"I am working 10 times harder than ever before," his father wrote about this unpopular post. "A little more would break me. I never get to bed before 2 o'clock."

Seeing his father confronted by endless rows of figures, the idea for a calculating machine occurred to Blaise.

Those were the glorious days before specialization set in. He moved quite naturally into the field of engineering, designed and had built some 50 calculating machines. And just as any inventor might do today, he took out a patent and tried to market them.

The principle of his machine is the same one used in today's taxi meters. Digits are arranged on a wheel. Each wheel, on completing one revolution, turns its neighboring wheel a notch. One machine, preserved in the Paris Musée des Arts et Métiers, has a right-hand dial slotted for a maximum of 12 deniers or pence, a center one slotted for 20 sols or shillings and the remaining one for 10 livres or pounds.

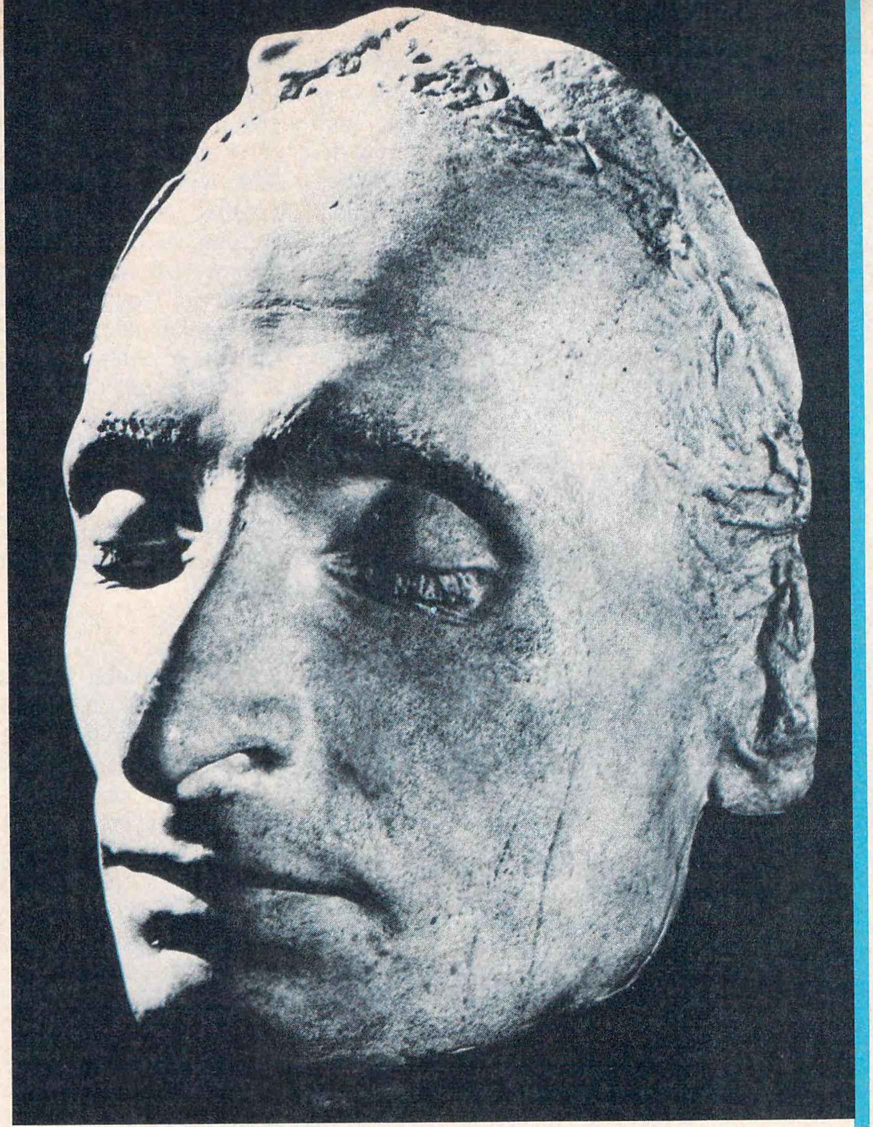
But manual labor was cheap, and besides, the 18 inch-long machine-with-a-wiggle-in-it, as it might have been called, broke down frequently because of inaccurate gear cutting. It was unmarketable.

Vacuum cleaner

Blaise next turned to physics to the Torricellian tube (a tube of mercury upended over a bowl of mercury).

He made experiments. If the height of liquid supported in a tube were independent of the space at the top, then it must be supported by atmospheric pressure. And thus atmospheric pressure must be less

Dr. Gleiser, whose "Lady Lovelace and the difference engine" appeared previously in **Computer Decisions,** is a California-based physical chemist and freelance writer.



Pascal

by Dr. Molly Gleiser

at the top of a mountain than at the foot.

In his personal life he was running into trouble. His father had died in 1651 and his older sister Gilberte had married. Jacqueline, her beauty disfigured by smallpox, had entered a convent. The family intimacy was gone, and he had formed no other close relationships.

As a child he had never made the usual school friendships, nor played any games. He was not loaded with money. He was not handsome. His curly crop of hair did not make him endearing and the flared nostrils of his long, bent nose emphasized one of his worst characteristics: he was quite aware of his own superiority.

For bettors and for verse

Pascal never married. He probably had disappointments, for he flung himself into the social whirl. He attended parties, salons, the theater. He gambled, and out of it came his mathematical theory of chance.

His work became frenzied. He refined his generalized theory of numbers. He devised his arithmetical triangle from which Newton deduced the binomial theorem and Leibniz the integral calculus. He had an enormous list of projects which he wanted to complete within a few weeks, although he suffered constantly from headaches and stomachaches.

Worse than these was the depression which enveloped him. The frantic activity with which he tried to fight it off only depleted his energies further. As his strength lessened, his interest in intellectual pursuits diminished.

On the night of Nov. 23, 1654, his condition reached a crisis.

Eight years before, two Christian converts, who had nursed his father through a broken leg, had made Blaise, until then a rote Catholic, spiritually aware. Now he was saved from the psychosis that was threatening him by a mystical religious experience.

Yet Pascal valued the memorial so much that he had the parchment on which it was written sewn into his clothing, where it was found at his death.

That evening, the world changed color for him. His depression lifted, his values changed. He had achieved eternal salvation. His main concerns now were religion and philosophy.

After math

Pascal did not completely withdraw from math, but it became a toy.

Once, when he had a violent toothache, he took his mind off the pain by solving the mathematics of the cycloid.

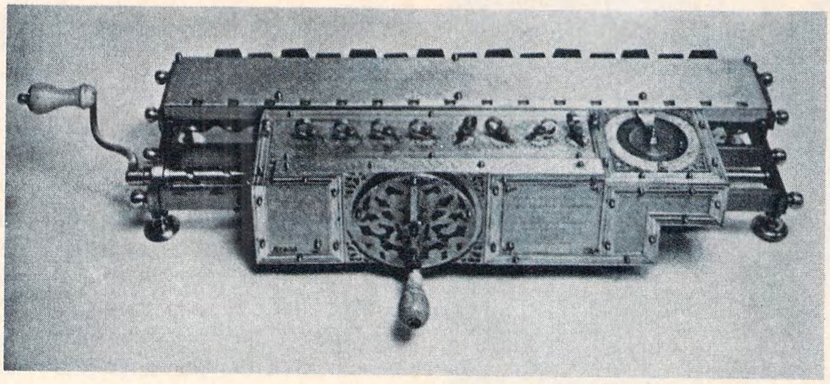
He strapped his pocket watch to his wrist for convenience, which was as unthought of then as it is mundane today. He devised a new method for teaching reading. He designed a well windlass.

One of his last works was to organize a public transport system in Paris. Every bus was jammed to overflowing as it ran through excited crowd-filled streets, making money at four cents a ride (which Pascal donated to the poor).

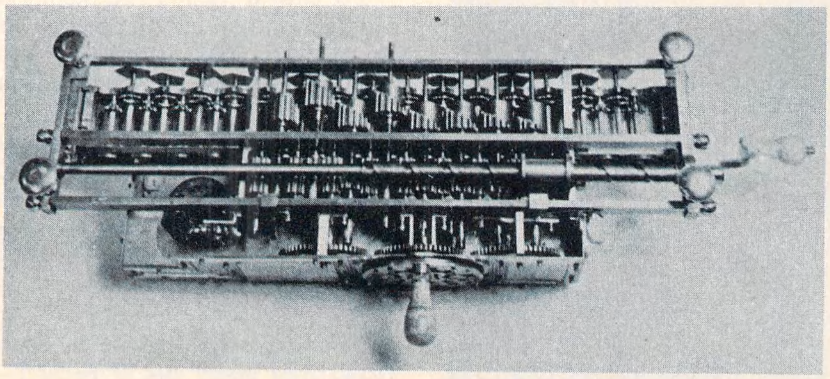
The quantity of his output was fantastic, but it was only the backdrop for his religious life. He made retreats to Port Royal, a religious community just outside Paris. He played his part in prominent theological controversies.

His last thought was for the poor, and he shared his home with a destitute family. When the man's son became ill, rather than send them away, Pascal moved into his sister Gilberte's house. There, on Aug. 17, 1662, he received the last sacrament and died. Immediate cause of his death was a brain hemorrage. He was not quite 40.

"May God never abandon me," were his dying words.



Machines with a wiggle: Leibniz's (above) and Pascal's



Gottfried Wilhelm Leibniz, born in 1646, when Pascal was 23, came from a background similar to Pascal's. He too was orphaned early—his father, a professor of moral philosophy, died when he was six years old. Like Pascal, he was an infant prodigy, and ran through the fields of law, politics, math, science religion and philosophy.

His father left the family a comfortable estate. Before he died he showed his library to his son, saying, "Take, read," which Leibniz did. By the age of eight he had taught himself Latin, and at 15 entered the University of Leipzig. When the university refused him his doctorate in law because of his youth, he transferred to the University of Altdorf. That same year he anticipated 20th century symbolic logic by publishing a plan for a symbolic language applicable to all reasoning processes. The university responded by offering him a law professorship.

Who's Kissinger now?

Leibniz had a great liking for power, and with his sparkling wit and the limitless mental energy that often characterizes genius he had no trouble ingratiating himself with those who wielded it.

It was this same ability that later got him into difficulties. "It was to be his fate," wrote Joseph Hofmann, author of *Leibniz in Paris,* "never to find firm ground under his feet, never to be able to create freely, but always to remain a tool in the hands of men of power who knew how to use him for their purpose, but who were quick to set up insurmountable barriers to his activities when he threatened to become troublesome."

He became the protégé of the Archbishop of Mainz, one of the most powerful men in Europe, who sent him to Paris, the world's cultural capital, with instructions to attempt to stop Louis XIV's march on Holland.

He was then 26 years old, the age at which most mathematicians have reached the peak of their achievements. Leibniz had done little work in the field, but once he began concentrating on it, he invented the integral calculus and devised the notation for integration and differentiation.

Drill pickle

Meanwhile, realizing his deficiencies in arithmetic—he had never been drilled in the multiplication tables—he designed a calculating machine that would make up for his shortcomings. His machine was an improvement over Pascal's. It consisted of a series of stepped cylinders, each with nine teeth of different lengths. Smaller gears, each representing a digit of the multiplicand, were set above them and placed so each could be engaged by that number of the cylindrical gears' teeth. A complete turn of the set of long gears, therefore, registered the multiplicand once; the multiplier was expressed by the number of times the long gears were turned.

This was another machine-with-a-wiggle-in-it, and like Pascal's, it was unmarketable.

Two's day world

Religion occupied much of his time. Envisioning God as the Great Mathematician, he invented the binary system—the importance of which he was the first to grasp—with religious significance. If 1 represented God, he could prove that God created the world (1) out of nothing (0).

"If God," he wrote on another occasion, "felt it necessary to produce what He does by metaphysical necessity, He would produce all possibles or none," the corollary being that all possibles are equal.

He is best known for the philosophical works of his last 40 years. The most interesting of these is his theory of monads, which were basic units—centers of force, not particles—with force fields around them. As usual he was hundreds of years ahead of his time: in 1966, Geoffrey Chew, an American physicist, stated that nuclear particles are not particulate in their behavior but are stable configurations, or resonance fields, of a strong force.

Patrons ain't

In 1712, his patron, Elector Georg Ludwig, nephew of his original patron, became King of England but Leibniz was not permitted to join him there. Without his patron he was like a scientist today without a grant. Sometimes his salary did not arrive, and he suffered from gout and failing health.

When he died—this man who invented the calculus upon which all modern physics, chemistry and engineering depend—only one man, his secretary, followed the coffin to its final resting place. □

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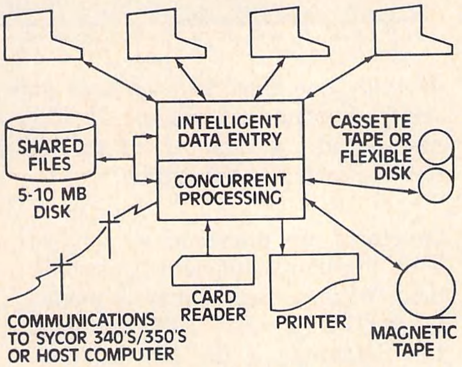

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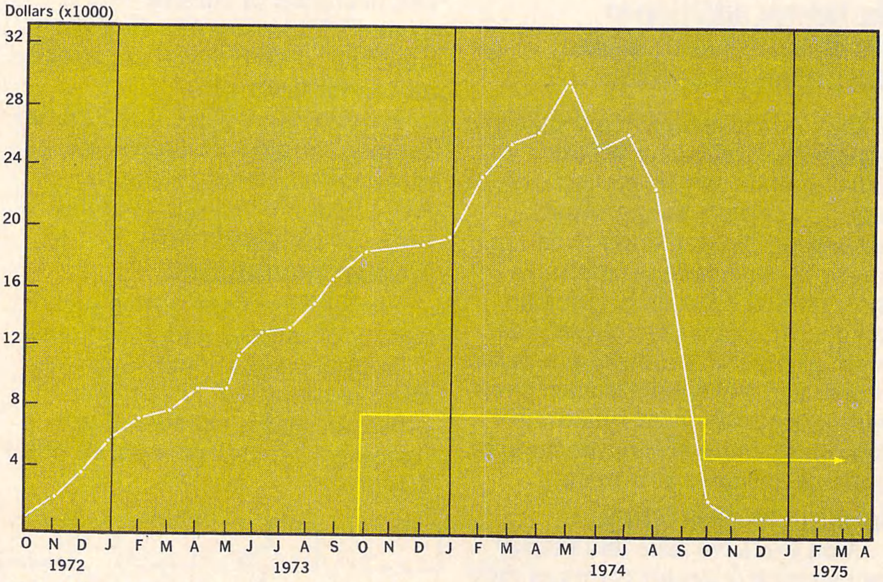
INFORMATION RETRIEVAL NUMBER 23

THE MINI ADVENTURES

Saddled with service bureau bills, this leasing company

by Grant Campbell



Monthly computer expenditures have shrunk from $30,000 a month for service bureau time to about $5,000 a month with the inhouse system. Other timesharing applications, mainly refinements to a new bidding model, will soon be added to the system.

Leveraged leasing, an equipment financing plan that got started in the mid-sixties, currently places an estimated $6 billion in equipment under lease annually. And it's growing at a rate of approximately 25 percent yearly.

Also compiling a remarkable record is the industry's largest independent (nonbank) leveraged lease underwriter, San Francisco-based Itel Corporation. Itel entered the leverage leasing business less than six years ago, but its two groups involved in underwriting leveraged leases, Financial Services and Data Products, have completed transactions whose equipment value totals more than $1.5 billion for its last four fiscal years.

Accompanying Itel Leasing's rapid rise to prominence is the company's growing reliance on computers to model the complex and numerous parameters that must be evaluated when underwriting a leveraged lease. Running counter to this computerization, however, is Itel's computer expenditure: $30,000 a month one year ago, but now a comfortable $5,000, reduced by judiciously switching from a large-scale timeshared system to an inhouse minicomputer.

Itel-igencia

Innovative computer techniques that minimize Itel's expenses are matched by automation that generates optimum returns for the participants in the company's lease underwritings.

Getting from leveraged lease theory to a closed leased transaction isn't easy. Before bidding on a deal or negotiating with a potential lessee, Itel specialists conduct extensive bid strategy sessions. Anticipated lease equity and debt structures are discussed in context with alternative financing possibilities. An investment analysis model is run on an HP 3000 to help Itel determine if the bid will appear attractive to the equity market.

To improve its bidding average, Itel also is experimenting with a bid model. The bid model is designed to help Robert R. Champion, Itel Leasing Corporation vice president, and Itel's staff determine the optimum bid. It evaluates the probability distribution of competive bids against the profitability of alternative Itel bids and Itel's own "aversion to risk."

The model considers the complex trade-offs in a bid: with a higher bid, potential profits to Itel are greater, but the chance of winning the bid are less; conversely, with a lower bid Itel has a better chance of winning, but at a less profitable rate. By quantifying its aversion to risk, Itel is able to make bids that balance profit with risk.

From the lessee's viewpoint the best bid is not necessarily the one with the lowest lease rate. In addition to an attractive rate, a lessee, committed to acquiring a $20 million jet aircraft, for example, necessarily wants assurance of the underwriter's ability to perform—to deliver equity and debt financing without later asking for compromises.

Teepee the balance

The lease underwriter's ability to locate funds, especially in periods of relatively tight money, often enables it to earn a premium in the rental rate a lessee is willing to pay.

Once Itel becomes the "best" bidder, the investment analysis model is called upon again, this time to analyze a specific deal for specific equity investors (lessors). More than 50,000 machine instructions comprise the model's program.

When evaluating a lease transaction for an equity participant, the model first determines monthly cash flows created by the investment. Investment yields are calculated on both a conventional accounting basis and an economic yield basis. The latter method takes into account the value to the lessor of secondary earnings on tax deferral funds. These earnings arise from redeploying tax savings.

rounded up a mini to ride herd on its financial chores.

OF THE LOAN ARRANGER

Minicomputers

To know how Itel accomplishes big things with its little computer, is to know something about leveraged leasing, its structure, the parties involved, and the sequence of events.

Stripped of complexities, here's a typical scenario. A capital equipment user, or lessee, needs new equipment: a utility requires new transmission equipment; an airline, a new airplane; a railroad, new rolling stock; or practically any sizable company, a new computer. Regardless of the need, the user's cash can be more wisely applied to research and development or may be ear-marked for operating expenses, and the user's taxable income may be currently sheltered, with rapid depreciation and investment tax credits.

Enter Itel and tax-leveraged leasing. As the arranger, Itel brings together the diverse interests of the lessee-user, an equity investor or lessor-owner, sources of debt and required owner and indenture trustees. To make final a deal advantageous to all, Itel also meshes many disciplines besides computer expertise: tax law and practices, contract law, finance, marketing, economic analysis, accounting policy and contract administration.

As a party to a leveraged lease, the lessee acquires the use of the asset for an extended time at a financing cost considerably below its effective after-tax long-term debt rate without paying any front-end cash.

The lessor, often referred to as an equity participant or investor, also enjoys numerous advantages, or leverage, from his investment. He invests as little as 20 percent of the equipment's cost to become the legal owner. Often he can receive more than a 15 percent return before tax from a combination of cash payments from the lessee and tax benefits derived from accelerated depreciation, deductions of loan interest expense, and investment tax credits. In addition, he retains ownership of the equipment at lease expiration. Part of the user's cost advantage is due to some of the lessor's tax benefits being transferred to the user in the form of reduced rental payments.

An additional important aspect from the lessor-owner's viewpoint is that the long-term debt in these transactions is non recourse to his credit. In other words, even though the lessor-owner is allowed to deduct the interest expense on this debt for tax purposes, he does not inherit any liability for debt repayment should the lessee default on the lease. In the event of default, however, he will have a tax liability based upon the amount of the debt outstanding.

Loan or debt participants, who supply the remaining 80 percent of the equipment cost, also find the leveraged lease attractive. Bonds issued to them under a leveraged lease constitute a fixed obligation, backed by the credit of the lessee and secured by a pledge of equipment, which initially costs more than the amount of the loan. To keep informed of available equity and debt source, Itel maintains relationships with more than 400 financial institutions throughout the country.

Rounding out the cast of financial participants in the leveraged lease is an indenture, or security, trustee, who holds a security interest in the leased equipment and takes an assignment of the lease for the benefit of the lender. He is a conduit for debt service payments from the lessee to the lender, distributing to the lessor any cash remaining from the rental payments. And finally an owner, or grantor trustee, may hold title to the leased asset for the benefit of the lessor-owners, acting as a conduit to pass tax benefits to these participants.

For its underwriting efforts Itel receives a fee from the lessor-owner at the time it closes a transaction which covers, among other things, its net legal, administrative and marketing costs. And it may receive an additional fee at lease expiration if the lessor elects Itel to act as an exclusive agent to dispose of the leased equipment in the most profitable manner.

The lease roundup

The model's introductory printout includes a summary of the lessor's investment parameters, including tax rates, facts pertaining to both the lease and debt structure, plus depreciation assumptions.

While performing these analyses, the model optimizes such factors as when to switch depreciation methods to enhance tax deferral benefits.

Another of the model's initial printouts is a tax accounting exhibit delineating the lessor's income, expenses, taxable income and tax liability for each year of the lease term.

Still another exhibit projects and allocates cash flow on a monthly basis. Shown are lease receipts, interest expense, principal payments and unpaid balance of debt, primary and secondary cash flows.

Included in the investment analysis printouts are a pro forma balance sheet and income statement for each year of the lease. The printout shows all accounting journal entries required on a monthly basis by the lessor-owner.

Completing the investment analysis printouts is a projected casualty and termination schedule and default exposure schedule. The former shows the payment that would be due the lessor by the lessee if the lease were terminated early, or if the equipment under lease became accidentally inoperative. The default schedule projects the exposure of the lessor should a lender foreclose on the equipment because of defaults by the lessee.

Interestingly, leveraged leasing is characterized by a virtual absence of defaults. Even railroads operating in bankruptcy make lease payments on rolling stock financed with leveraged leases.

Thank you, masked mini

Projecting such estimates on a monthly basis for, in many instances, leases as long as 25 years generates considerable paper, approximately 40 pages each time a complete run of the model is made for a lease.

This in part explains the high cost of Itel's recent timesharing computer service ($30,000 a month) compared with its present inhouse mini expense ($5,000 monthly). With the company's former 100-lines-per-minute printer, more than two hours daily were required on its remote timeshared large-scale system simply to control the printouts of its investment analyses. In effect, the previous timesharing operation was an online operation which accepted inputs but batched the return printouts.

Occasionally bottlenecks would develop because of transmission line or printer problems. A day's production was salvaged only by diverting printouts to one of the company's 30-characters-per-second hard-copy terminals. However, this practice often gobbled up a whole day because of the terminal's low print speed.

No reservation

Now, with its minicomputer system, Itel uses two higher speed printers, operating at 200 and 600 lines per minute. The former is located in the company's Data Products Group, which utilizes the Financial Services Group's services to support its computer leasing business. (Data Products arranges System/370 leases that are often packaged for attractive pricing with Itel peripherals, obtained on an oem basis from independent manufacturers.) Before the installation of the HP system, "it could require up to three hours before a leasing specialist could see a model printout," says Ross Scroggs, Itel's manager of computer system analysis. "Now it's available in a couple of minutes." Scroggs admits there is a temptation to overuse the faster system. As a result, summary models are used in the early stages of an analysis, in which totals instead of line details are shown.

I/O Silver

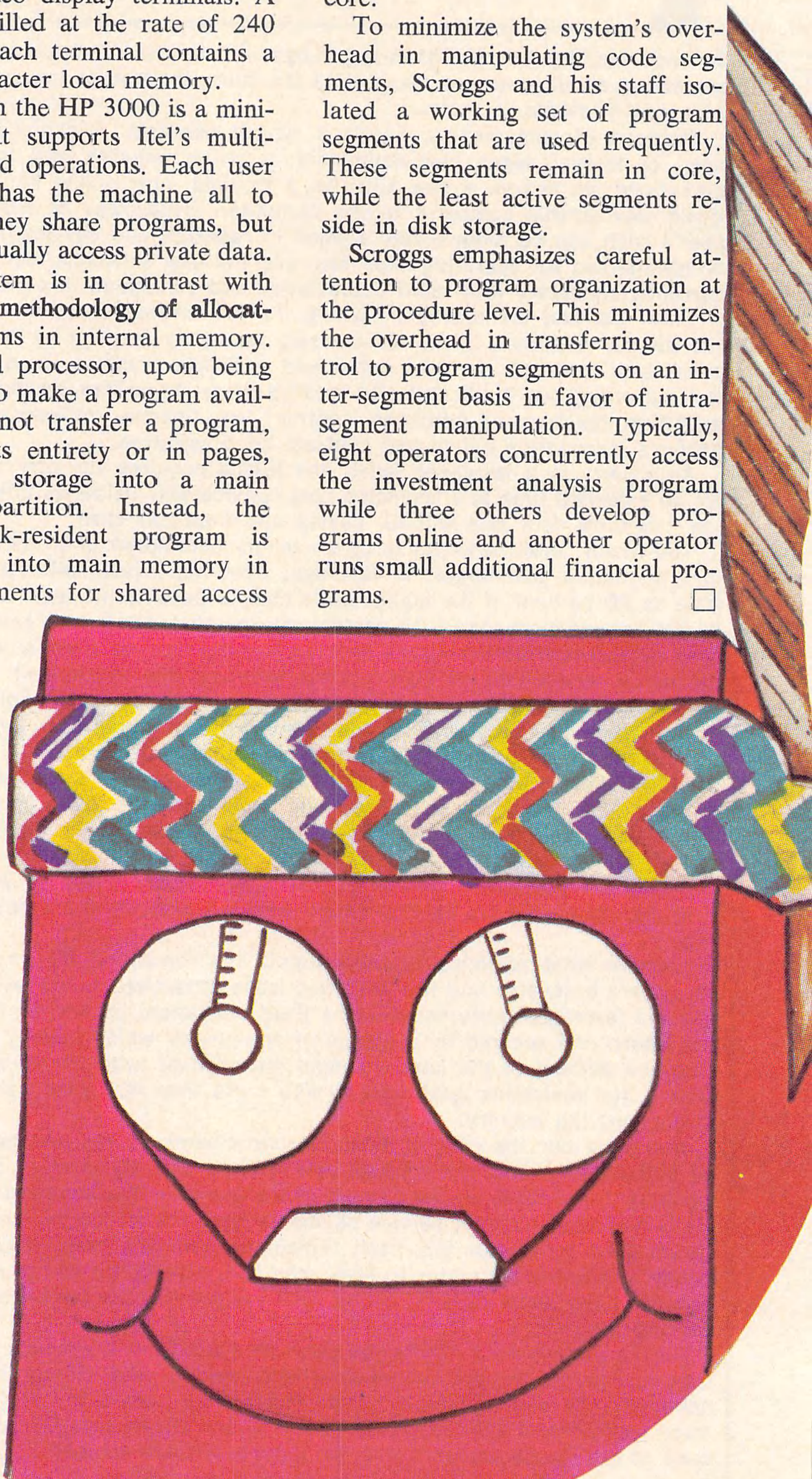
Gone also are the 30 cps hardcopy printers, replaced with HP-2640A video display terminals. A screen is filled at the rate of 240 cps, and each terminal contains a 5,000 character local memory.

Although the HP 3000 is a minicomputer it supports Itel's multiprogrammed operations. Each user thinks he has the machine all to himself. They share programs, but can individually access private data.

The system is in contrast with traditional methodology of allocating programs in internal memory. The central processor, upon being requested to make a program available, does not transfer a program, either in its entirety or in pages, from disk storage into a main memory partition. Instead, the master disk-resident program is transferred into main memory in logical segments for shared access by all users. Thus the computer's core is not burdened with excessive amounts of duplicated code. It's all transparent, automatically under control of the operating system called *Multi Programming Executive* along with the computer's hardware. If a program segment is needed, the operating system searches for it in internal core, through the virtual memory area of the disk or in the disk's file area and then positions it for use in core.

To minimize the system's overhead in manipulating code segments, Scroggs and his staff isolated a working set of program segments that are used frequently. These segments remain in core, while the least active segments reside in disk storage.

Scroggs emphasizes careful attention to program organization at the procedure level. This minimizes the overhead in transferring control to program segments on an inter-segment basis in favor of intrasegment manipulation. Typically, eight operators concurrently access the investment analysis program while three others develop programs online and another operator runs small additional financial programs. □



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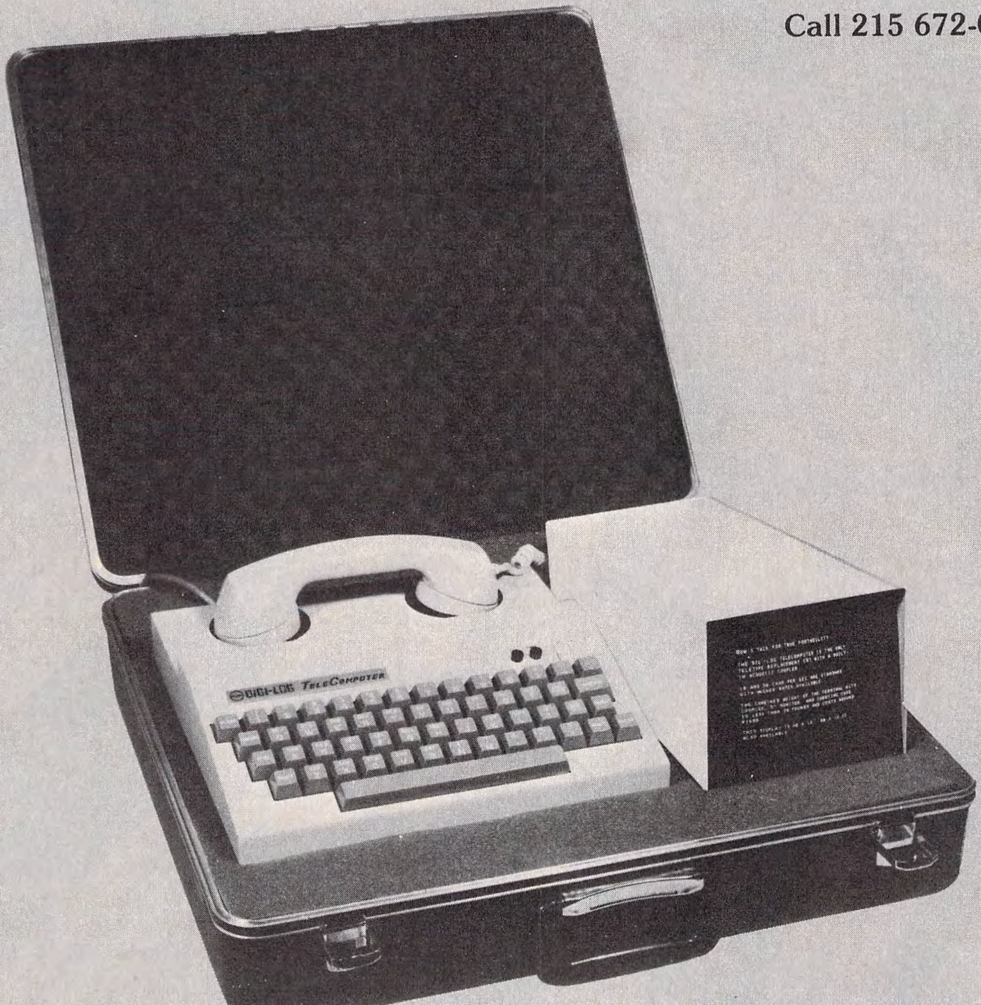

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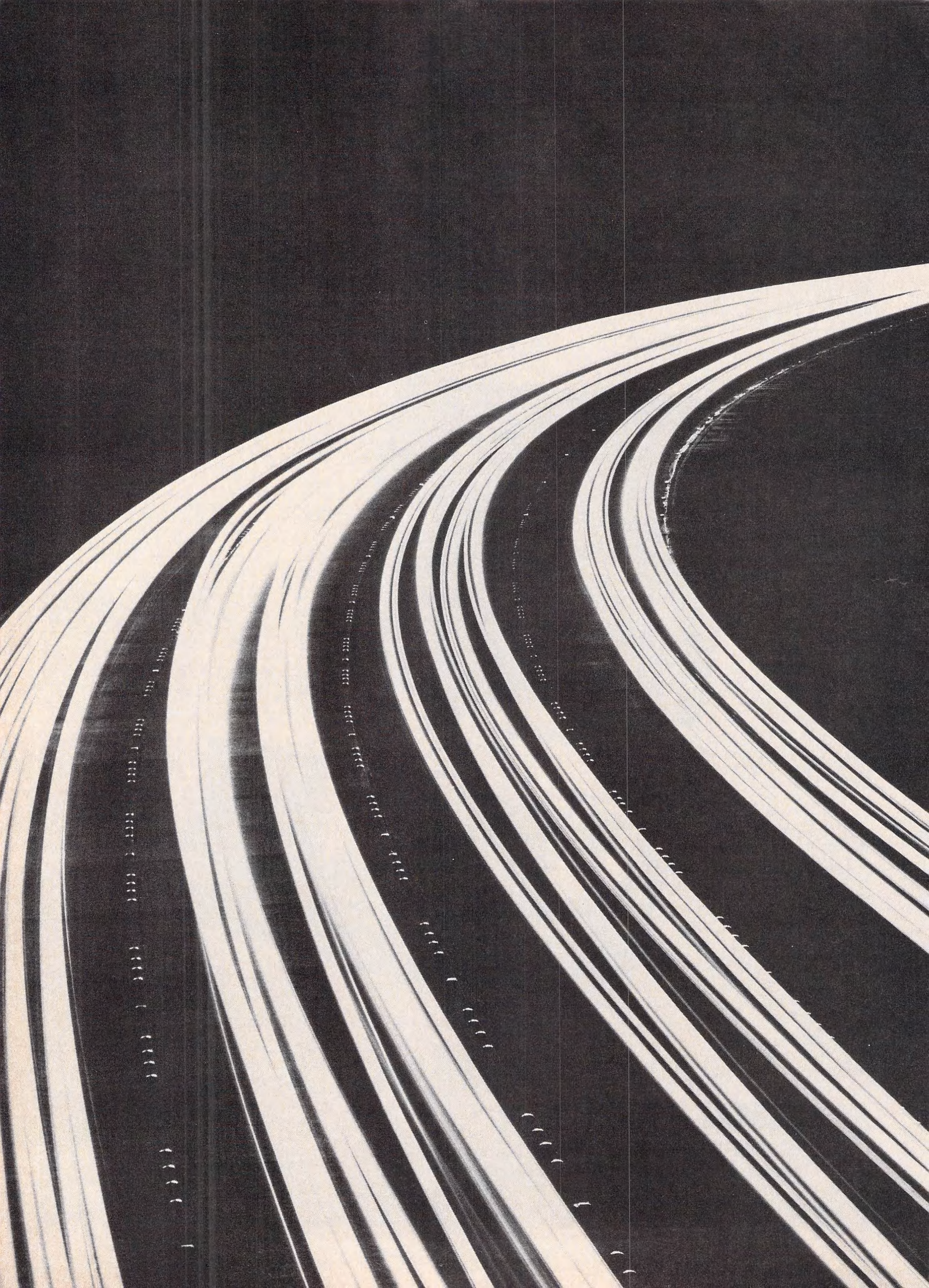

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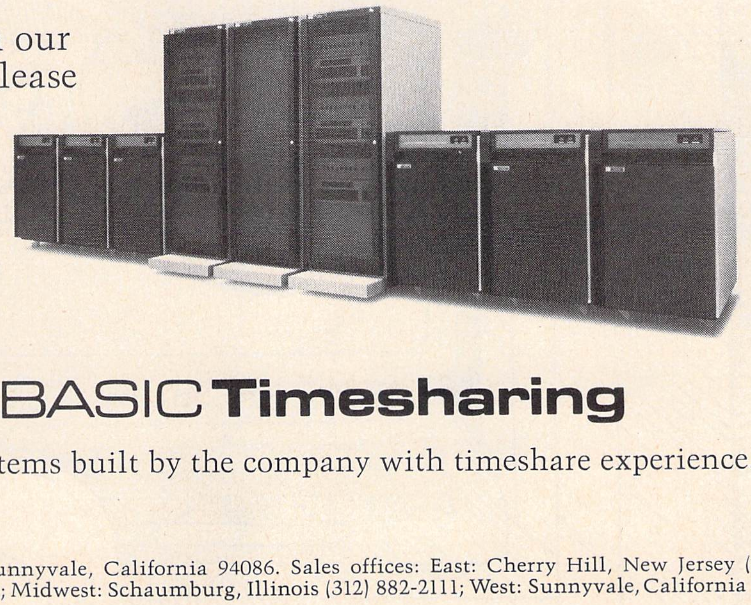

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INFORMATION RETRIEVAL NUMBER 29

by Linda Flato

EFT and crime

Who knows what evil lurks in the hearts of men? Certainly not the unsuspecting banker who has entered the electronic age on a wing and a prayer. Wishing for a miracle, a growing number of banking innovators have pegged their hopes on the new electronic funds transfer systems. And so have a brazen breed of computer age con men, bound and determined to bilk the bank by using the system.

It's an age-old story and one that is particularly familiar to Donn Parker, the project leader of Stanford Research Institute's computer crime study. Parker likes to put things in historical perspective: "If you look at assets throughout history, business was first carried on by bartering goods and services. Then we went to precious metals as a basis of exchange, and from there to paper as a form of assets. Now we're going into a transition from paper to electronic pulses and magnetic patterns."

Parker claims that these assets stored in computers through electronic pulses are indeed the actual assets. "We now have an entirely new form of assets as we shift from paper to computer-stored assets."

MacKenzie's first law says that if it's not on paper, it doesn't exist. Offering a corollary to that law, Parker says that "if it's not in a computer, it doesn't exist. We are not there yet," he adds, "but EFT certainly is an indication that assets are actually stored in computer systems without any paper to back them up."

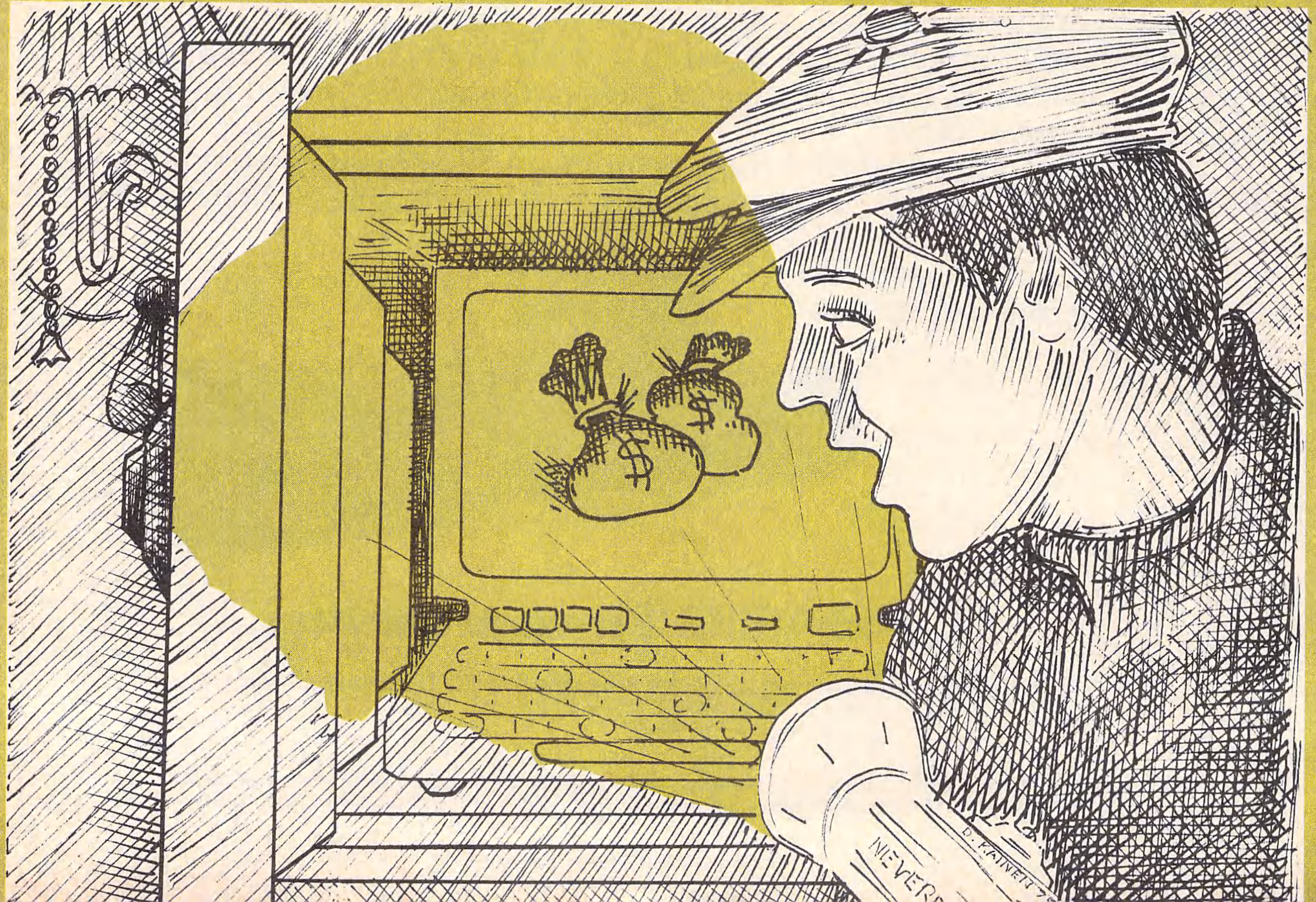
Using Treasury Department reports on bank fraud and embezzlement, Parker calculates that there was an average loss of around $500,000 in 1971 from schemes involving computers. These figures do not surprise Parker, who says the financial community ranks third in the number of reported cases of computer abuse.

To get inside the perpetrator's psyche, the SRI computer crimewatchers have developed a profile which pinpoints some general personality characteristics. This profile data, garnered from interviews with 18 perpetrators, depicts the computer crook as a typical white collar criminal who has never been in trouble with the law before. He is generally employed in a position of trust inside an organization. The crunch comes when he is confronted with a problem or a goal which requires a violation of that trust.

Computer swindlers in banks tend to follow the same pattern. Parker says these perpetrators are usually insiders—computer operations people, programmers and data handlers such as the tellers and processing clerks. These inside jobs can also involve collusion with outsiders.

Head-on collusion

According to Parker, there is an "extremely high incidence" of collusion in computer crimes. This collusion is usually not between programmers and computer operators, Parker explains, "because they are antagonistic people. Programmers hate computer operators and operators hate programmers." But the real reason they don't join forces is because they don't need each other to pull off a shady scheme. The outsiders that these programmers and operators go in cahoots with, he notes, "are people who can convert what they have done technically into some kind of gain."



Computer technology is breeding a new kind of criminal. Donn Parker, a new kind of G-man, wants the collar.

Parker breaks down computer fraud in banks into two categories—inspec and nonspec. In inspec frauds, the computer is used exactly as it's supposed to be used, and the crime involves the manipulation of data passing through the system.

As an example of the inspec type of computer fraud, Parker cites the famous Union Dime embezzlement case. The bank's head teller used his online terminal to perform a simple lapping operation which skimmed money from savings deposits he took in over the counter. The bank had two kinds of savings accounts: one where interest was calculated the day before the end of the period, and the other where interest was figured the day after the end of the period. Taking advantage of this, the wily teller moved all the money into the accounts where interest was due to be posted. Then the next day, he cleverly transferred the money back to the other accounts. His devious manipulations netted him $1.5 million.

The nonspec fraud involves the unauthorized use of a computer. The computer is used in ways counter to its usage specifications.

To illustrate the nonspec computer fraud, Parker describes the case of a conniving head of computer operations in a bank. The cunning computercon used a utility program that directly accessed and manipulated data in files to transfer money from savings accounts into the accounts of three of his friends. Then his partners in crime strolled into the bank and withdrew the money. This computer-assisted heist was pulled off within a single quarter because customer statements were issued on a quarterly basis. Keeping this in mind, the computer operator was able to zero out the accounts of his three stooges before the end of the quarter, covering his tracks so that there would be no evidence other than the approximately 20 accounts with less money in them.

But the dper's luck ran out when the unexpected happened. Before the end of the quarter, an inquisitive customer, who came in to make ance. The unfortunate man discov- a savings deposit, requested his bal- ered a $1,200 shortage in his account. Tipped off by this discrepancy, the victimized bank checked further and found other accounts with similar rip-offs. It then wrote a computer program to analyze the files, comparing the current state of accounts with the last quarter compilations. The computer culprits were caught red-handed with their $128,000 booty.

No effect on fraud

Hollis Bowers, the head of the Insurance and Protection Division of the American Bankers Association, believes computerization has had little or no effect on bank fraud or embezzlement. Parker basically agrees. "There is still only a very small amount of fraud associated with computers, compared with the total amount of fraud. The important aspect of it is what it portends."

Looking into his crystal ball, Parker predicts that with the further expansion of EFT systems, the number of computer crime incidents in the banking area will go down while the losses per incident will go up. Instead of acting as a catalyst for crime, EFTS may actually be a deterrent, he argues. "There's going to be less potential relative to the opportunity to commit fraud and a greatly increased potential in the size of the losses. But if you look at today's manual methods and compare them to a full-blown EFTS network, the number of people in positions of trust that can do bad things is going to go down significantly."

Window pain

But "once a person builds a 'window' into a bank's computer system, more assets flash by that 'window' per unit time," Parker notes. "So assets are more vulnerable because they're more concentrated in an EFT system."

Parker is also optimistic about the efficacy of system safeguards. "The amount of cost-effective controls that can be put into these EFT systems to detect any anomalous activities," he contends, "is going to make the perpetration of fraud a highly sophisticated thing."

So if the new computer age con man wants to subvert the EFTS technology, he will have to be smart enough to circumvent this built-in protection. "The stakes are higher," Parker admits. "If someone is going to rip off a bank, he's going to have to do an awful lot of work. The work factor is going up." In order to make all this hard work pay off, the perpetrators will "only be going after the big stuff."

To get the big stuff, the new Jesse James types will be looking for vulnerabilities in the bank's computer and EFT systems. They may not have to look too hard. According to Parker, it is currently impossible "to safeguard a computer system to any reasonable level because there are people who have the skills, knowledge and access to do anything they want in a computer system without anyone ever finding out about it."

IBM researchers Dr. Stanley Winkler and Lee Banner also see the insidious element in this type of crime. In a recent article they pointed out that "unlike the theft of property, the stealing of valuable data from a computer system leaves the data in the system apparently untouched."

Reason to believe?

Parker refers to what he calls "the big lie syndrome" to describe how people are conned into believing in the total security of a bank's dp setup. "There is no practical way in currently available commercial computer systems," he emphasizes, "to protect ourselves to the point of 'the prudent person theory.' " In Parker parlance, this theory means that a strictly prudent person would have complete confidence that everything practical had been done to protect the system.

But unfortunately the prudent person theory cannot be put into practice today because, as Parker points out, "commercially available computers simply are not secure."

Another technologist who recognizes the loopholes in computer security is Steve Lipner of the MITRE Corp. Presenting his opinions at an EFTS security conference last spring in Washington, D.C., Lipner warned that "the norm of what can be done to computers today is cheap, easy, undetected penetration. The computer, if it's properly

Computer Con Man In Cahoots With Wife

A debt-ridden 19-year-old programmer in a small West Coast bank came into the bank early one morning and ran the computer for a fictitious day. After he got the system running, he got on either by using an online teller terminal or by writing a program. Through this chicanery he managed to transfer $100 from 41 different accounts into an account his wife had opened under an assumed name. The dynamic duo had planned the swindle for the Memorial Day holiday so they could take the money and run over the long weekend.

Cruising up to a convenient drive-in teller window, the dutiful wife began withdrawing the money in $500 chunks. Because of the $500 withdrawal limit, she was forced to make many return trips, disguising herself with an assortment of wigs and driving different rental cars.

The caper went on past the holiday weekend. The bank finally got wise when a man came in to check his savings account balance and found $100 missing. The game was up. The bank examined the disgruntled man's account and discovered 40 other $100 no-book transfers. So the bank wrote a program that compared that day's closing balance with the previous day's and thus located all of the accounts. It also pinpointed the wife's suspicious account and promptly called in the FBI and local police. The crime fighters set up a stakeout at the drive-in teller's window and captured the computer culprits in the middle of another $500 heist.

programmed, is not only a tool to do banking functions, but it is also a tool to affect its own penetration."

Getting into programming intricacies, Lipner explained how to take over a system: "Software, once it's written, doesn't fail—it's either right or wrong. If a program has an error, it retains that error until it's fixed. If there are errors, they can be exploited. Testing won't help. A security exposure in a computer program may not have anything to do with the fact that that program does its function. If you run just the right program in just the right way, all the protection is bypassed."

Lipner described the operating system as another important factor in computer security. Its "weakness," according to Lipner, lies in its complexity—its thousands of detailed instructions.

"In a computer or EFT network the problem is compounded," he noted. "The computer at one bank may be passing authentication or authorization information to a second bank computer which has no choice but to believe the first computer." Lipner labels this the "good guy syndrome"—if data comes from another computer, "he's got to be a 'good guy.' "

Network penetration

In the area of network penetration, Lipner admitted that nobody can be sure what's going to happen. "All we know is that network penetrations can be done. They're scary because the theories behind preventing them aren't really worked out yet."

One thing Lipner is sure of, however, is that the vulnerabilities are proliferating. He cited staggering figures from a recent study on financial fraud using computers. The study reported around 300 incidents with an average loss of about $500,000 each for a grand total of $150 million.

SRI's Parker believes that "the most serious problem is that there is no way to prove the integrity of a computer system from one auditing period to the next. It's been done in a laboratory environment with a great deal of effort, but it cannot be done on any practical basis in today's large commercial computer systems."

In most cases, Parker explains, certified public accountants and internal auditors are thwarted in their attempts to audit bank dp systems because "they are not taking into account the programmers who can do anything they want to. The auditors won't catch it, the management of the bank won't catch it. And I don't really believe that top management in banks understands their true vulnerabilities."

Parker thinks the banking community has got to wake up and "realize that there's going to be a different kind of fraud then there was before." He says most bankers aren't aware of this because of their isolation from their dp staff. "The only person who relates top management to what's going on in edp is the auditor. The edp people are defensive. But if the top management knew how vulnerable their edp operation was, there would be some serious misgivings about ever going into EFT."

To the bar?

Parker has a term which describes a bank's true dp vulnerability. He calls it "The Maximum Time to Belly Up" (MTBU), which he defines as "the maximum amount of time a bank can stay in business after its computer goes out of commission."

Once the system is immobilized, a bank has very few options. "It's getting to the point," Parker explains, "where systems have become so unique that a bank cannot take its applications to some backup computer or to the bank across the street. So a bank is totally reliant upon the computer system with its highly unique front end."

Banks are beginning to realize these front-end problems, Parker says, and as a result many larger banks "are going away from the monolithic computers. Instead of getting one big monolithic computer system, some banks are now installing two smaller ones."

Brian Ruder, a research engineer in SRI's Information Systems Group, is convinced that one of the biggest problems in the computer security area is the penchant for classifying all perpetrators in the same category. "There are different problems for each different skill. You have to look at the problem from two viewpoints—those of the external and internal perpetrator."

Ruder believes there will be very technically astute outsiders who will see EFTS as an opportunity to break the bank. " But the major way to beat EFT systems for the next few years is going to be through an inside schemer. The typical way to beat banking systems is to find out if the system has a flaw somewhere."

The technically knowledgeable outsider, however, may ultimately be a threat. Ruder believes "there are going to be all kinds of nice, sophisticated ways to manipulate" the customer bank communications terminal. Since most crt terminals generate signals, one easy way to get information is to patch into that signal. From this you can get personal account and identification numbers which can be used to make a bank card.

In addition to interfering with these terminal radiations, wire-tapping can also be done on terminal systems which use regular phone lines, Ruder adds.

Spoofers can also be used to hoodwink the computer by creating a signal that activates the system. A person with a phony card could be in cahoots with someone who has a spoofer. When the fake card is read by the terminal, a signal is sent back to the computer which recognizes that the card is fraudulent. This alarm signal is then transmitted back to the terminal. But as it goes back, it's intercepted by the spoofer, which sends back a valid signal that opens the cash drawer.

Grift-bearing creeps

Most of the system machinations involve software violations, Ruder says. The "trap door" and "Trojan horse" are examples of these devious software manipulations. A programmer can build a trap door in the software which allows access to files and programming changes. The procedure is done by inserting code into a program in such a way that when a particular sequence of instructions or a particular event happens, the trap door is flung open. Through this trap door a programmer can gather data on accounts, enabling him to credit and debit them illegally.

Like the trap door, the Trojan horse involves the illegal insertion of code into a program. A bank programmer writes a program and adds extra code in the middle which is triggered by some series of events. The extra code recognizes either an ID or an account number.

The major stumbling block in EFTS security, Ruder maintains, will be in the data entry area. "The biggest problem in EFTS for some time is going to be how to guarantee that the data coming in is legitimate. If you can look at your system design to ensure that there aren't serious flaws, you can cut down on the major problems."

Having writ . . .

Another security weak spot is identification. Ruder admits the card system used today "is really bad. The technology is going to have to improve in that area."

SRI has been delving into the ID area in an attempt to come up with feasible automatic identification procedures. George Warfel, a consultant in payment systems, supports the signature dynamics concept.

Warfel defines signature dynamics as "the speed and rhythm with which a person writes his name." This handwriting speed is considered to be almost a reflex action, a response that is dependent on a learned characteristic.

Taking into account all the technological, people, input and ID problems, Ruder believes EFT offers more potential for abuse and errors." In a manual system," he explains, "you are limited to the transactions you can make. Therefore, there are errors that are confined to a locale. But in EFT, you can start to see crosscountry kinds of problems cropping up. When a national network develops, these problems could be compounded. One error could potentially start to effect the entire system."

The whole EFT security problem ultimately rests with dp personnel, Parker stresses. "People in data processing do not realize they are functioning in a hostile environment. They think it's still the benign environment of the edp functions of the past. So edp people are particularly vulnerable to being conned into things.

"If you can't trust your people, if your people are suspicious, forget about doing any of the technical things for protection. Because it's got to be the people that make the protection work."

IBMers Winkler and Banner put it this way: "Ignorance, apathy and boredom (of the computer room staff) are as dangerous as intentional dishonesty." ☐

Hints from the EFTS-wise

Giving advice is often easier than taking it. But in the complex world of EFTS and computers, banking users can benefit from sound security advice. So here are some words to the wise banker.

Lipner: "In the near term, it's advisable to control the environment, limit severely who can program computers that are processing sensitive or financial information. Service bureau time should certainly not be sold to outsiders who can write programs on machines that are processing sensitive data. The financial community should emphasize its needs and plan to be able to apply secure systems when the vendor community comes out with them."

Warfel: "For EFT, we need a new concept of what constitutes a forgery. Because if the criminal misrepresents who he is and obtains another person's funds, he hasn't committed forgery."

"A double custody procedure should be followed where two men write the software and change the code every day. Another good deterrent is fragmenting the software among a team of four so that no one person knows what any of the other three has done. This could also be done in the software coding. The problem of security in EFT systems must be solved by the technologist, because it rests in technology not in policy or law. You can't legislate honesty."

Ruder: "The system design should be reviewed by looking at it from a perpetrator's point of view. Review your total system design from the perspective of a system programmer who may be trying to break your system. In other words, do a threat analysis to find out where you are vulnerable."

Parker: "I'd require everybody in data processing to go through a periodic review of the security requirements and their positions of trust and responsibility. They would have to sign statements acknowledging that they'd been told these things. I would enforce a separation of responsibility to keep programmers out of the computer room and operators out of the programmer's areas."

"A bank must have an identifiable person in line management who is responsible for security. And it also must have an auditor who checks that person to make sure he's doing what he's supposed to be doing. If a bank doesn't have those two functions, it's going to be in serious trouble."

The deathly stillness of the Florida night was broken only by a cicada's rasp. Offshore, the great white shark cruised, hungry. Richard Bach, nerves taut, sat at the home computer terminal. 'Armageddon,' he thought. Breakfast was far off.

(Richard Bach is the author of Jonathan Livingston Seagull)

We know that this century is run by enormous computers, and that computers, the big ones, do not fail unless they are deliberately unplugged. Let us come face to face with a giant computer that is firmly plugged in and programmed to totally destroy us and we learn how rabbit feels, hypnotized by cobra: It is frozen in a kind of horrified awe.

Cobra, for me, was the Massachusetts Institute of Technology's *Tech II*, the celebrated chess wonder. At something after 2:30 a.m. of a predawn Wednesday, *Tech II* announced that its schedule was open to grind to powder this amateur who sat at chessboard and common home computer terminal in Florida.

Awe that is, all right. My carefully thought moves of pawn and knight, typed into the keyboard . . . not a half-second later, before my fingers were even off the keys—WHOK! There's the computer move in reply, along with a smug printing that it did indeed answer my knight in 0.1 second real time.

The machine destroyed me in six minutes—me, who learned chess at my father's knee before I turned eight-years old. Totally unexpected, brilliant metal moves, and in 371.9 seconds I had been checkmated by the 20th century, a feeling familiar to more than chess players.

Do rabbits get used to cobras? In that six minutes, awe changed to a sort of terrified respect at what the thing could do. I was torn and bloody, but all at once alert and angry, furious at what had happened. I pounded keys that cleared the board and set a second game. But it was no game at all, it was Man against Computer. It is easy to think such things in the silence of 2:38 a.m., with nobody to help and that humming thing poised like a lightning steel spider to rip you apart.

The next two hours were grim, joyful hell. There is zero compassion in modern computer circuitry; it sees and bites like a blind shark of the sea. By 3:58 it was a bishop and four pawns ahead, and I saw the board as a page of a textbook: position hopeless, White resigns.

But human beings are so used to hopeless positions and think so illogically that when they ought to quit they finally begin to fight. I heard a strong, fierce voice rising from my deepest soul to the computer: "Look, you've got me surrounded and pinned to the wall, but you are gonna have to come in here and drag out my dead body 'cause I am never gonna quit to you, ever!"

No emotion, it simply came in to get me, knights, bishops, pawns. Flik. Flik. Flik.

But then one of my foolish rooks didn't fall back. It took off on its own and it *attacked the computer!* The machine response-time for the first move of the attack was 75.6 seconds. It just sat there, thinking, for that long. The second move of the foolhardy rook stopped the computer for 189.2 seconds, the third, for 453.2 seconds. I'll call that victory, to know at least that the monster was finally having to THINK in order to kill me. In the midst of these long silences I crouched over the board, first in cold tension, then in a sort of anguished glee. Could this be? I could swear . . . I had come up with a glorious reply. Man to Machine, and there was no way out!

The ominous—flik—of its move, printed out on my little terminal. A cold oiled reply, Machine to Man, and my attack broke like a rocket hit midair.

Despair, then total fury. Teeth gritting hard, I raced a pawn down the edge of the board, desperate to replace my fallen queen. A long time thinking, it took, watching me the way a hunter watches a deer in his rifle-sight before squeezing the trigger. That coldly, that cruelly it watched. But something had somehow gone wrong. The hunter fired too late, and deer turned to wild stag, mad to kill.

The computer looked at my final desperate attack for 337.4 seconds, but there were no miracle surprises left for it to play. Its—flik—was a weak move! In one step my pawn turned queen, and queen took violent, exploding revenge—capture, capture, check, check!

There were fewer and fewer choices for the machine to make. Its reply-time fell from 76 seconds to 33 to 4. As if circuits were burning out, fuses were blowing, it slumped its king against the wall.

Bathed in sweat, trembling, I fired the queen one more time. "Answer that one, bucko—*MATE!*"

Without anguish, ceremony, emotion, there was one bursting clack from the computer. When I looked, it had printed Time—0.0 . . . it had no moves left at all; it was finished. I didn't think that could happen, but I was there and that's the printout pinned on my wall. A supermodern 1975 chess machine had just been checkmated by a collapsing, exhausted human being at a cheap home terminal.

We know this century is run by enormous computers. But it is well sometimes for Man to bash Machine—leave it plugged in, but bash it, once in a while. Remind it who's boss. (Gasp. Pant.)

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Modems and multiplexers

Data Communications

If your lines are busy, you may be in need of new data communications hardware. Know what you're buying before you go for it hook, line and bisynch-er.

by David H. Axner
Datapro Research Corp.

Modems are the vital links between communications lines and terminals or computers. Although they've been an important part of data communications for the past decade, it was not until January 1969, the famous Carterfone case, that modems supplied by independent vendors could be attached to the dial telephone network.

Though most computer users have gained sophistication through their increasing familiarity with the data communications environment, today's users are nonetheless confronted by a modern marketplace that offers a broad and bewildering array of models exhibiting a wide range of transmission speeds and a host of attractive features.

Modem merrier

A modem is a device that accepts data from a computer or terminal in the form of a digital pulse train and transforms the data into a form more suitable for transmission over a communications facility; another modem restores the data to its original form. Hence, the term modem—*mod*ulate, *dem*odulate.

During the infancy of computer-oriented communications, the only modems commercially available, for all practical purposes, were those supplied by the common carriers at a cost in addition to that of the communications service. The modem concept, however, was not a new one; suppliers of military communications equipment and telephone equipment had been incorporating modems as an integral component of total systems. With emphasis on terminals as a powerful extension of the computer and the increasing use of terminals such as the IBM 1050 system, a new market area—the modem market—opened.

Beginning with just a handful of suppliers and a limited number of modems, the industry experienced rapid growth to where there are now at least 50 suppliers offering more than 280 discrete models of commercial modems. The impetus for such rapid growth can be credited to the increasing number of timesharing services, the proliferation of computer-communications installations, the revised AT&T tariffs which allow non-Bell System modems to be attached to the public telephone network via a Bell System protective connecting device, and the slowness with which AT&T responded to users' needs.

The current independent modem market shows most of the action in the low-speed class (up to 600 bps), which represents 86 percent of the installed user base. Medium-speed (1200 to 4800 bps) and high-speed (over 4800 bps) modems account for 11 and 3 percent of the current user base, respectively. Projections through 1980 forecast this distribution to remain virtually the same.

The independent modem market has changed very little during the past year in respect to the number of vendors. To the amazement of those who continue to predict a large dropout as a result of stiff competition among the independents and pressure from AT&T, 1974 saw the demise of only about half a dozen vendors.

Access powers

Non-Bell modems can be connected to the public telephone network via a Bell System-supplied protective connecting device referred to by Bell as a Data Access Arrangement.

The Data Access Arrangement, installed for a nominal charge with rental fees of $2 to $6 per month, assures network integrity by limiting the signal power from the attached modem to a level that does not exceed the power-level restrictions of the telephone network. Excess power injected into the network could result in signal interference such as crosstalk (coupling of one circuit with another).

The Manual Data Access Arrangement, contained on a single circuit board, includes a separate telephone set with a voice/data key and restricts the connection to the telephone network to a manual operation.

Computer communications, for efficient large-scale operation over the dial network, require automatic dialing and unattended answering capabilities. These are available with the Automatic DAA.

The Data Access Arrangement remains a subject of bitter recriminations among the independent modem makers. Changes by AT&T in the design of the equipment, which required redesign work by the modem manufacturers, seem to have been the spark that ignited the fire. AT&T claims that the public telephone network must be protected. The independents state that they are quite willing to build equipment to meet any reasonable specifications, and that AT&T is using the DAA as a weapon against erosion of the company's own modem market.

Author David Axner is data communications editor of Datapro 70. This article is extracted from two Datapro 70 reports, **All About Modems** and **All About Data Communications Multiplexers,** available for $10 each from Datapro Research Corp., Delran, NJ 08075. For more information circle no. **475.**

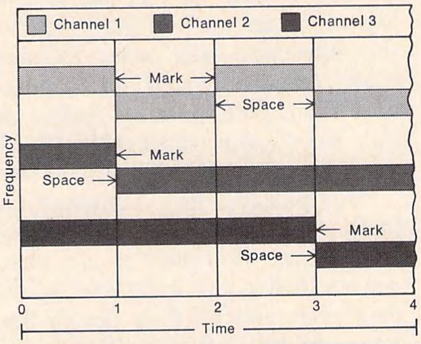
# modem digest
from Tele-Dynamics

#2 Are you ready for multiplex data transmission?

Some data-communications systems are born for multiplexing. Others have multiplexing thrust upon them. Your system may be growing into "thrust" proportions.

If all the terminals feeding and being fed by the central computer are in one building (say a library, a department store, or a police headquarters), you're a logical candidate for a frequency-division multiplexing (FDM) system. In gathering messages from four, five, or six terminals and shooting them out in one stream to the computer, the multiplexer is in fact a big master modem that saves you the cost of separate modems and separate lines, plus possible contention for transmission and computer time.

Let's say you have five or six 300-bps channels in communication with the same CPU. Instead of hanging a separate modem on each terminal with its own dial-up number, it may be time now to lease a single 3002 line with C2 conditioning, and buy a six-channel Tele-Dynamics Model 7260 FDM for each end. The FDM slices the allotted bandwidth into six parts to send and receive all those data channels simultaneously. If you have only three or four channels, the same multiplexer can do the job without a conditioned line.



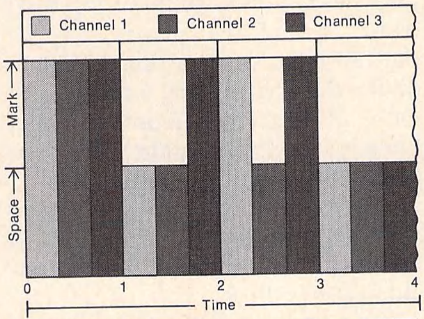
With FDM, these three channels occupy separate frequency bands within the total mux bandwidth at any given instant.

Since there are two methods of multiplexing (frequency division and time division) now available, how do you know which one is right for your purpose? That's a question many users ask us early in the game, and it's rather easy to answer.

If your system will consist of several channels of low-speed data (any speed up to 300 bps), undoubtedly your best buy is FDM. The terminals need not all be at the site of the multiplexer, either. Individual channels can be dropped off at various remote locations with a single-channel subset to feed the multiplexer as it talks with the computer in another city.

And the terminals need not all be identical or have the same bit rate. One channel may be hooked to an ancient TTY, one to a higher-speed printer, one to a CRT, and so forth. The FDM accepts the various bit rates and appropriately modulates them for transmission.

Now about time division. If the data you want to multiplex is already at a speed of 1200 bps or more, your only choice is TDM, because only with a TDM and a high-speed modem can you fit the data into the available bandwidth. The TDM samples and transmits many high-bit-rate channels by allotting them separate *time* slots in the high-speed digital output signal. A few bits at a time are taken from each channel and sandwiched between the same number of bits from each of the other channels to form the multiplexed data stream.



With TDM, the same three channels alternate rapidly within the same time frame. Channel 1 is always first, Channel 2 second, etc.

So the choice between FDM and TDM depends on your data rate, the number and location of your terminals, and your pocketbook. FDM is a lot more flexible, a lot easier to plan and modify in a rambling and changing geography, and a lot cheaper—provided you have low-speed terminals and are willing to buy another pair of multiplexers for every six channels you add.* TDM is your only choice if you have a fixed system of high-bit-rate terminals, or a combination of low- and high-rate terminals that would require high bandwidths for multiplexing.

*By the way, our Model 7260 FDM is getting a fine reputation for reliability and low error rate among very fussy users who threw out their old multiplexers for ours. Send for a data sheet.

Modem Digest

modem digest
from Tele-Dynamics

A publication dedicated to answering the most-asked questions about data-communications equipment: What type of data set or multiplexer is best for my particular application? What characteristics should a superior modem possess, and why? When should I move up to high-speed communications, and when shouldn't I? and many more interesting subjects covered in some depth by this easy-to-understand quarterly booklet. Ask us to put you on the list to receive Modem Digest regularly.

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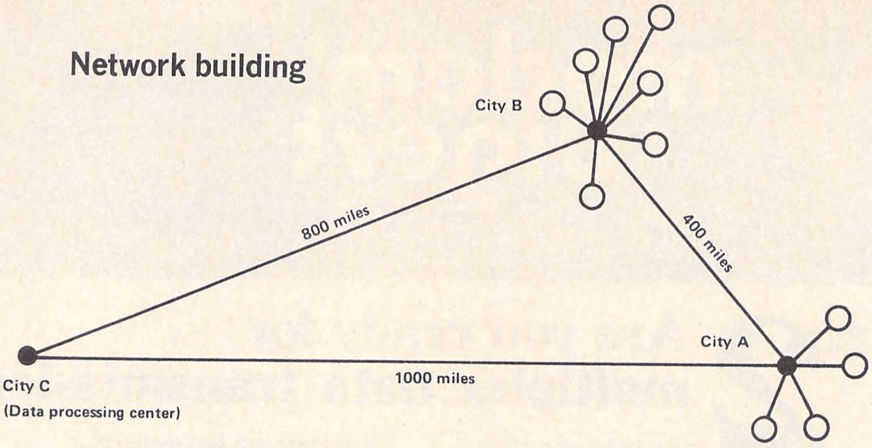
Network building



Terminal-hours per day		Monthly Line Cost Using DDD	Difference in Line Costs Using Multiplexors	
City B	City A		Two Lines (AC & BC)	One Line (ABC)
6	4	$ 4,562	$ 2,754	$ 3,218
30	20	22,812	21,004	21,468
60	40	45,625	43,817	44,281

The successful operation of a data communications network depends on the ability to spot failures and to diagnose the trouble accurately. Equipment for diagnosing data transmission problems is available in the form of integral modem features, portable test units, or central site monitor and diagnostic units for large networks. Diagnostic capabilities range from basic functions such as local and/or remote loopback to very sophisticated forms of testing that analyze the quality of the received signal. The degree of sophistication for any specific network must be determined by the user. Obviously, cost tends to increase in proportion to the level of testing capability.

The most common form of diagnostic testing in the loopback function, which allows the user to perform a complete test of the data link, including the local modem, remote modem and interconnecting telephone facilities, all from one site.

Other, more sophisticated measures for diagnosing communications failures include such features as a self-test capability for determining the operational status of the modem before connecting it into the data communications network, and random pattern generation and detection for diagnosing errors resulting from random noise, harmonic distortion, and phase jitter—all specific transmission problems that influence the quality of the transmitted signal.

Central site diagnostic equipment is available that will automatically run online tests of communications facilities, remote modems, and terminals without operator intervention at the remote sites. Intertel manufactures one such device that can accommodate as many as 12 multipoint lines with 40 points on each line.

Integral modems

For some time, it has appeared that the neatest solution to the whole modem problem is simply building the modems into the terminals. Technically, it is not difficult. Some savings over present separate arrangements should be available because of elimination of some duplicated or unnecessary circuitry and cabinetry.

Feelings among the modem makers vary as to the importance of the built-in modem concept in future years. No small part of the problem is the necessity to generate a special design for each different terminal. General purpose, free-standing modems, by adhering to standard interface specifications, are assured of wide application. But there are no standards for logic-level interfaces, which is what the modem maker normally has to work with if he builds an integral modem. Thus, each design would have limited application.

The next logical question is that if it's such a good idea to build modems into terminals, then why don't the terminal manufacturers take the initiative and develop their own? Part of the answer may be that terminal makers don't want to dilute their efforts in any way. A more fundamental reason is that built-in modems would raise the price of the equipment.

And these days especially, users want to save dollars. One way to do that is to multiplex your communications lines.

Multiplex your muscle

Multiplexers can combine the multiple paths of a data communications network into a reduced number of physical facilities. As a result, these devices can yield substantial dollar savings.

Because communication line charges constitute a major part of the total cost of every data communications network, careful network planning is essential to reduce facility requirements to a minimum. Through the use of multiplexers, multiple data paths between remote terminals and a central computer can be combined on a single communications facility. A multiplexer is used at each end of the line to logically combine and then separate the individual data paths. Furthermore, this device can also be used at intermediate points (nodes) to link lines from geographically diverse locations into a common line.

Multiplexers are restricted to basic multiplexing/demultiplexing operations. Multiplexers are characterized by equal input and output data rates and by their design limitation of one line per channel. Because of this design, casual usage might not be cost-effective. Throughput is reflective of input loading. Less than full loading results in unused output capacity. However, as a result of their basic simplicity, multiplexers are potentially more reliable and are less expensive that their more complex counterparts, concentrators.

The growth of multiplexers can be traced directly to the need for high-volume, low-speed communications. It is an effective way to reduce communications costs—under certain circumstances. In general, these circumstances can be reduced to two overlapping situations. Multiplexing should be considered within your communications network when you need multiple, independent data paths between two points; or when you have multiple data paths that parallel each other for a distance. The second criterion includes the situation in which multiple points are communicating with a central point and the remote points lie along a more or less straight line.

Many into one

Implementation of a computer-based communications network for information processing involves selection of computers, modems, communication lines, terminals, and possibly programmable communications processors to serve as "front ends" for your computers.

To get a basic feel for the subject, let's consider a hypothetical system (Illustration, opposite). Assume that a central data processing facility is located in City C, together with multiple locations clustered around Cities B and A that need independent, rapid communications with the processing facility in City C. Further assume that the locations clustered about Cities B and A are within local-call range of their respective cities.

Of the various possible approaches for configuring the system, we will consider three:

- Direct calls (DDD) for each location to the processing facility in City C.
- Leased voice-grade lines between Cities B and C and between Cities A and C. Each cluster of locations will be multiplexed over the respective leased line.
- A leased voice-grade line extending from A to B and then to C.

The nature of the computations will be to see the differences in cost among the three arrangements for the communications facilities only. The differences will show the amount of money that can be spent on multiplexing equipment to achieve the same total costs. If multiplexing equipment can be acquired for less money, then that difference represents savings. The parameter used as a variable is terminal-hours, or the number of terminals multiplied by their average usage per day. This figure gives the cost of using DDD for communications. Use of the multiplexing equipment and leased lines is a fixed monthly cost and is independent of usage.

The potential savings are considerable even for moderate terminal usage. Naturally, the calculations have been simplified, but they do include typical charges for modems for the leased lines. In this particular case, the greatest savings would probably be accomplished by routing one line from point A through B to C. In this arrangement, three ends would be required, one at each city. The multiplexing equipment would have to have multidrop capability, which would increase the cost of the individual stations, but probably not as much as the requirements for four ends for the arrangement using two leased lines into City C. The geographical locations would, of course, play an important role in determining the best configuration for a particular system. This method can be used to advantage to gain perspective as to which of several arrangements offers the most potential. ☐

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Management

A manager looks at system design

And finds that many projects get off on the wrong foot and often cost more than they should.

by Raymond J. Epich
Cresap, McCormick & Paget Inc.

Despite the current number of highly qualified data processing professionals, systems design is being carried out in a way that is astonishingly inefficient. And while management information systems and total information systems have been developed at great cost, they rarely deal with management information nor are they total in any sense of the word.

The cost of systems design and computer programming is several times greater than it should be. Companies which have automated too much, too soon and at too great a cost may be at a greater disadvantage in the long run than those less automated.

What is management information?

Management information is the information needed to manage. Simple, right? Well not really, since many who manage will have trouble defining it and many who will quickly offer a definition have no management ability at all.

Management is the allocation of company resources to the accomplishment of predetermined objectives—a process requiring strategic and tactical planning, factoring of these plans into smaller scale objectives, assigning these objectives to subordinates who control subsequent progress. Using this definition, management can be distinguished from the actual accomplishment of the smaller scale objectives, or operations.

If it were possible to separate executives into two groups, management and operating personnel, it would be much simpler to discuss management information. But classification is extremely difficult. Executives spend some of their time managing and some overseeing operations. The boundary is fuzzy and always shifting.

Classifying activities is equally difficult, since few, if any, are readily distinguishable by the planning, factoring, assignment and control features of the definition. Take planning, for example. Is an executive planning when he or she reacts to stiff competition by cutting prices? In some respects, yes. The price cut may be the initial action related to a whole series of smaller scale objectives, responsibility assignments, control processes and follow-up activities. The decision to reduce the price may require access to more data, require more penetrating analysis and entail greater computational activity than a formal plan to build a new factory or market a new product.

Assuming management activities are carried out by management personnel, can we know how these are carried out? Can we know what management information is needed to perform a particular activity?

Actually, we know very little about management decision-making. And until more is known, information systems should deal with overseeing operations and not with management itself.

Total isn't total after all

Whoever coined the term total information systems certainly gave it little thought. Those who use it are guilty of gross overstatement. So-called total systems do not convey one thousandth of one percent of the information needed to manage a company, and probably not one tenth of one percent of the information needed to operate one.

It's unfortunate that those purveying so-called total systems can't be forced to operate their own companies with such a system, unaided by other sources of management and operating information. Their activities would wither quickly.

You don't have to be a purist to be offended at the use of the word total for something that so obviously is not. This term may prove embarrassing to systems personnel for two reasons: a manager may actually expect a total system and may be hard pressed to explain why the system as designed falls short of the mark; a manager may accept the system as total and hope it will provide all management and operating information.

In the first case, the company might assume it was shortchanged. But in the second it could mean stagnation because of faulty management.

Costly design and programming

While systems are being conceived more attention should be paid to subsystem integration. Often systems are needlessly proliferated when more thorough examinations of objectives would have eliminated them entirely.

At the next level of effort, run flow design, which is the specifica-

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Mr. Epich is vice president and firmwide director of information systems services at Cresap, McCormick & Paget.

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tion of run-to-run computer processing flow, there is even greater waste. It is not unusual for several computer runs to be eliminated entirely when run flow concepts are examined by experienced and imaginative people. Failure to perform such a review could result in a needless increase of perhaps 100 percent in total installation cost.

At the detailed systems design and programming level, much of the work proceeds in an undisciplined manner, subject to spasmodic review by less than qualified people. Rarely are work standards employed. Quite often progress is not carefully monitored. Lack of standards and failure to monitor accuracy and progress could increase costs by an additional 50 percent. When inefficiency is the rule, costs could increase 300 percent, or more.

Many systems cost two times what they should. Why?

The personnel assigned the responsibility of systems design do not have the necessary intelligence or creativity to conceive of suitable systems.

Personnel having responsibility for systems design fail to make full use of the experience of operating management.

Operating management has not tried to participate in the installation of the systems.

Basic scheduling and control devices are not used to monitor progress because much routine work is wrongly classed as unmeasureable creative labor.

Of these, the first is the most serious. It also is at the root of a paradox which is only now being understood by top managers. The situation is something like this. Systems and data processing personnel have accumulated 20 or more years of experience installing all sizes and shapes of systems. In most instances they have done this inefficiently.

The paradox is this: the environment is changing in two dimensions simultaneously. Systems are becoming more complex as they assume the true shape and characteristics of the manual systems that they replace. Programming techniques are becoming less mysterious as computers have been designed and equipped to operate with less dependence upon procedure-oriented statements.

As system complexity grows, greater ingenuity will be required for design. This will attract problem solvers who now function elsewhere in the company. And as programming becomes less procedure-oriented it will attract problem solvers. Those already in the field, with the most experience, will become the most expendable. Operating management will not only challenge the programming gymnasts, they will take away their gymnasium and put it to their own use.

Too much, too soon?

Is it possible that companies that have spent a great deal of time and energy applying mechanized data processing techniques to operating problems will actually be at a disadvantage when it comes to the design and installation of management information systems? It is possible, especially if the earlier effort cost two to three times more than it should have and showed less than satisfactory results.

Similar situations develop in many companies today, brought on by the following:

Unqualified personnel are responsible for the systems design effort.

Operating managements are ducking their responsibilities while so-called management or total systems are being installed by these unqualified people.

The installations are being built in costly ways.

Corporate funds, energy and enthusiasm in support of these systems installations are being needlessly dissipated, in some instances never to be made available again.

The resulting systems will be much less than satisfactory, requiring parallel support to be effective. Some may actually impair the firm's ability to operate.

The design of large-scale information systems, for the most part, will require expenditures much greater than any allocated in the past. The data base required may be 10 or 100 times larger than the master files common in today's applications. And the capital requirements of such large-scale information systems projects are substantial.

Safeguards against costly failure

Companies building large-scale information systems need only follow a clear plan for their efforts to be successful.

Place the information systems design project under the direction of an executive whose ability is commensurate with the scope of the project, measured in terms of either payout or cost.

Take a good hard look at all of the systems and data processing personnel participating in the project. Use whatever criteria you wish, but weed out substandard personnel before the project is too far along.

Take full advantage of the experience of operating management by assigning several as principal members of the installation team. Surprisingly, they may know more about information requirements than staff personnel.

Look at the opportunities for mechanizing operating systems more completely before approaching management systems.

If you really know how management decisions are made and what the information requirements will be, try to design an improved manual management information system first. The return from such a project may be greater than from one which mechanizes the preparation of the same data.

Formulate an overall system concept, but don't try to install it all at once. Factor the project into several integrated subsystems and rank these in priority sequence based upon return on investment criteria. Tackle each subsystem separately, in series or in parallel, yet provide for full integration. You may find, as the marginal return on investment becomes less and less attractive as successive subsystems are installed, that low priority subsystems are not worthwile mechanizing at all.

Don't hesitate to defer the design and installation of true management information systems for a few years until they are better understood. It's quite possible that this may put you ahead of your competition. ☐

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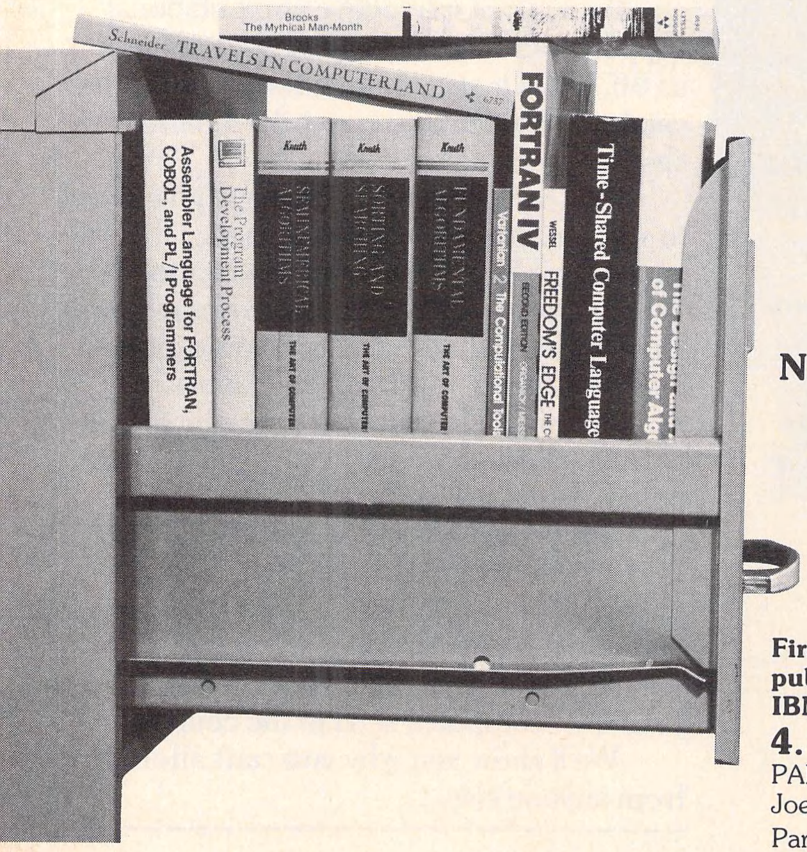
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PLEASE PRINT ALL INFORMATION REQUESTED BELOW. (Do not use periods, commas, etc.)
INDEPENDENT CONSULTANTS MUST ATTACH BUSINESS CARD.
THIS APPLICATION WILL BECOME VOID IF IMPROPERLY FILLED OUT.

FIRST INITIAL LAST NAME ________________ TITLE ________________

Company Name (Please Use Full Official Corporate Name - DO NOT ABBREVIATE) ________________

DIVISION/DEPARTMENT/MAIL STATION ________________

STREET ADDRESS/ P.O. BOX # ________________

CITY ________________ STATE ____ ZIP CODE ________

A ☐ **Your own primary area EDP activity:** *(Insert code)*

1. **User** of Computing or Data Processing Equipment.
2. **Manufacturer** of Computing or Data Processing Equipment.

B ☐ **Your Title:** *(Insert Code)*

COMPANY MANAGEMENT

- O **General & Corporate:** President/Owner/Director/Chairman/Partner, Vice President/General Manager.
- P **Financial:** Comptroller/Treasurer, Vice President Finance, Chief Accountant.
- C **Administrative Services:** Vice President Operations, Director or Manager Purchasing/Personnel/Office, Director or Managers of Microfilm.
- V **Marketing:** Vice President Sales/Sales Manager, Director or Manager Marketing.

COMPUTER/SYSTEMS OPERATIONS

- 1 **Management, Computer Operations:** Vice President/Director/Manager/Head/Chief of EDP Director/Manager Programming Director/Manager EDP Operations.
- 2 **Management, Systems:** Vice President, Director/Manager/Head/Chief/MIS Director/Manager Systems Director/Manager Systems & Procedures Director/Manager/Communications.
- H **Supervisory:** Supervisor Equipment/Analysis, Chief/Lead/Senior Programmer, Chief/Lead/Senior Mathmatician, Senior Systems Analyst.
- L **Staff:** Analyst/Systems Analyst, Mathmatician, Programmer, Machine or Computer Operator, Software Designer, EDP Auditor.

ENGINEERING/MANUFACTURING

- A **Management:** Vice President or Director of R & D, Vice President or Director Engineering, Plant or Production Manager/Director, Chief Engineer.
- B **Staff:** Member Technical Staff/Group Leader, Systems Engineer, Design/Production/Research Engineer, Maintenance Engineer, Application Engineer, Other Engineer.
- Y **CONSULTANT**
- Z **EDUCATOR:** Educator (instruct EDP) and Educator (use EDP).
- M **OTHER** ________________

C ☐ **Primary end product or service of your firm at this location:** *(Insert code)*

- A Manufacturing: Computers, Data Processing and Peripheral Equipment.
- B Other Manufacturing and Processing.
- D Government: Federal, State, Municipal including Military.
- M Educational: Colleges, Universities, and other Educational Institutions.
- P Computer and Data Processing Services including Software Services, Service Bureaus, Time Sharing and Consultants.
- G Finance: Banking, Insurance Real Estate, Securities, and Credit.
- H Trade: Wholesale and Retail.
- X Medical and Legal Services.
- K Transportation Services: Land, Sea, and Air.
- Y Utilities: Communications, Electric, Gas, and Sanitary Services.
- T Construction, Mining, and Agriculture.
- U Other Business Services, such as Hotels, Amusement and Non-Profit Organizations.

D-1 Computers at this address: *(Please be specific)*

	Model	Qty.	Oper. Sys. OS, DOS, etc.	Model	Qty.	Oper. Sys. OS, DOS, etc
A Burroughs						
D Control Data						
F Digital Equip. (6,10)						
L Honeywell/G.E.						
O IBM						
R NCR						
W Univac/RCA						
Z Xerox Data Sys.						
Other						

F I select or purchase *(check all that apply)*

Computers

- I ☐ Digital (small scale)
- X ☐ Mini computers
- 3 ☐ Digital (medium and large)
- E ☐ Scientific or engineering applications

Peripherals & Accessories & Services

- G ☐ Data Communications equipment
- H ☐ Programmable Calculators
- M ☐ CRT Terminals
- N ☐ Remote Batch Terminals/Systems
- P ☐ Intelligent Terminals
- R ☐ Disc Drives
- S ☐ Tape Drives

- J ☐ Graphic CRT's
- K ☐ Key to Disc Devices
- L ☐ Key to Tape Devices
- T ☐ Add- on memories
- U ☐ Service Bureaus
- F ☐ Microfilm Output Devices
- A ☐ Modems
- B ☐ Multiplexers
- C ☐ Optical Readers & Scanners
- E ☐ Magnetic Tape

- V ☐ Education & Training
- W ☐ Computer Leasing Service
- X ☐ Time Sharing
- I ☐ Teleprinters
- Y ☐ Software Systems/packages
- 2 ☐ Plotters
- 4 ☐ Printers
- O ☐ Binders, Forms, Indexes
- Z ☐ Environmental Equipment Supplies

E ☐☐☐ I do have on site:*(Insert code)*

1 Computer
2 Data terminal
3 Tab equipment
4 None of these

☐ **This location is:** *(Insert code)*

A Hdqtrs.
B Div. Hdqtrs.
C Mfg. plant
D Home
E Other (specify)
F Sales Office

☐ **Employees at this location:** *(Insert code)*

A 1 to 19
B 20 to 49
C 50 to 99
D 100 to 249
E 250 to 499
F 500 to 999
G 1000 to 1999
H OVER 2000

D-2 Minicomputers at this address: *(Please be specific)*

	Model	Quantity	Model	Quantity
3 Cinn. Milacron				
C Computer Automation				
E Data General				
F Digital Equipment				
I General Automation				
K Hewlett Packard				
M Honeywell				
O IBM				
N Interdata				
P Lockheed Electronics				
4 Microdata				
6 Modular Computer				
5 Texas Inst.				
X Varian Data Machines				
Other				

We will be glad to send a free subscription card to:

Data Processing Mgr. ________________

Data Communication Mgr. ________________

Person to whom you report ________________

APPLICATION WILL BE VOID UNLESS ALL QUESTIONS BELOW ARE ANSWERED. PLEASE ONLY USE CODES SUPPLIED BELOW FOR ANSWERS.

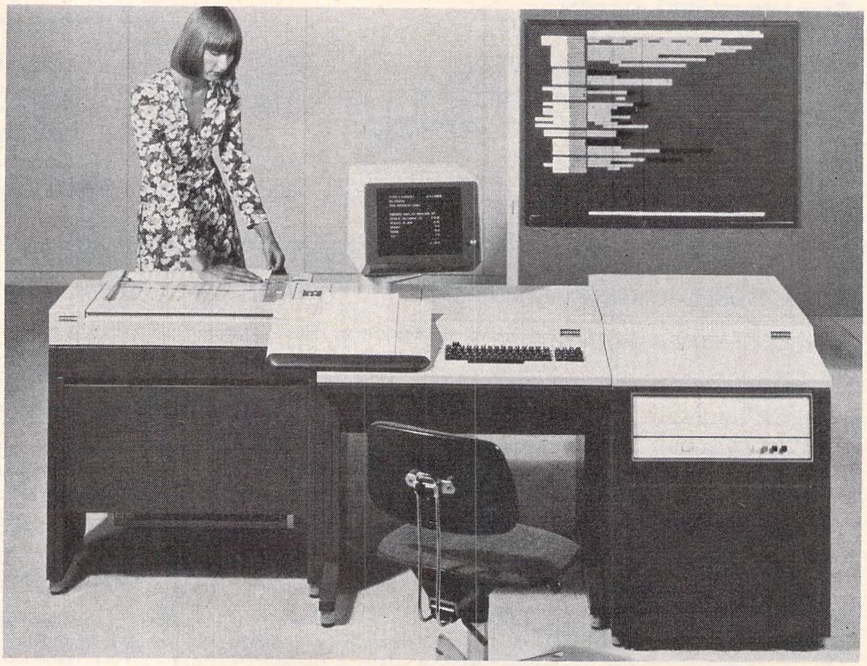
CD 10/75

Built-in storage turns crt into data station

The model 2644A terminal, with 22,000 bytes of built-in mass data storage, can perform on a stand-alone basis that normally requires connection to a computer. For data entry, forms can be stored on one mini-cartridge and selectively retrieved. Program preparation, editing, tape copying, and tape-to-printer operations are all within the stand-alone abilities of the microprocessor-controlled 2644A. In the 2644A application, 115,000 bytes of serial information are recorded single-track on each cartridge, using the full width of the mini-cartridge's 140 feet of tape at a density of 800 bpi. Tape speed is 10 ips, so transfer rate to or from the display is up to 800 bits (1000 bytes) per second; since search is at 60 ips, average access time is 10 seconds. Standard features include character and line insert and delete, cursor sensing and positioning, programmable protected fields for forms, off-screen solid-state memory storage with scrolling and page-select, tabulation, 8 special-function keys for user-defined routines. Price of the 2644A Mini Data Station is $4,400 in quantities of six. It is available now.

Hewlett-Packard, 1501 Page Mill Rd.,
Palo Alto, CA 94304.
(415) 493-1501.

CIRCLE NO. 100



Nixdorf's small system is modular, multiprogrammable

Nixdorf's 8870 computer system with accompanying peripherals and software can accommodate multiple 10 megabyte disk drives and up to nine crts. The computer can provide solutions to complex decentralization problems for large multi-branch companies, and for small-or medium-sized firms, it can provide a central information system. Using the 8870 system, users will be able to start small, adding more peripherals to the system as needed. Initial use will be in the areas of order writing and invoicing, inventory control, accounts receivable and account payable, sales analysis, general ledger, and payroll. The 8870 uses a standard alphanumeric keyboard and a 10-key numeric keyboard, allowing clerical personnel to learn to use the machine. Input terminals provide instantaneous response, and the disk system is totally transaction oriented, allowing the operator to interact with the system for editing and validation. Basic configuration of the 8870 consists of one 10 megabyte disk drive, one 100 lpm printer, and one basic crt. The basic price of the 8870 is $40,000, it is available now.

Nixdorf Computer Inc., 5725 East
River Rd., Chicago, IL 60631.
(312) 693-6600.

CIRCLE NO. 101

Microcomputer kit gives choice of processor

Called CRAMERKIT, this ready-to-assemble microcomputer is available in three models. Developed in conjunction with Microcomputer Technique, Inc. of Reston, VA, these kits come equipped with either an Intel 8080, a Motorola 6800, or a Texas Instruments TMS 8080, as the central processing unit (cpu). Each CRAMERKIT contains all the active and passive components (except board and power supply) necessary to build a functional microcomputer, and includes, in addition to all parts, engineering documentation, literature, schematic diagram, and programs recorded on a cassette tape. The complete components and documentation package enables a designer to design and fabricate a custom microcomputer to suit specific needs. The products cost less than $500 and are available now.

Cramer Electronics, Inc., 85 Wells
Ave., Newton, MA 02159.
(617) 969-7700.

CIRCLE NO. 102

CYBER 76 models feature main memory, new disks

The CYBER 76 computer system has added three models: the CYBER 76-121 containing 64k words of small semiconductor memory and 256k words of large core memory; the 76-122 with 64k and 512k words; and the 76-142 which includes 128k words. Both the 76-121 and -122 can be field-upgraded to a model 76-142 by adding the appropriate small or large memory increments. This larger small memory capacity allows users to perform more simultaneous multiprogramming functions completely within the small memory section. Purchase price of model 76-121 is $5,214; model 76-122 is priced at $6,622; and model 76-142 costs $7,519. All three models are available now. Also introduced, is the CDC 7639/819 subsystem with a high capacity disk drive and controller. Each 819 storage unit holds 412 million characters of data on a fixed 22-disk pack and up to four 819s can be connected to each 7639 controller.

The 819 uses voice-coil head positioning to read and record data stored at 6,000 bits per inch. Purchase price of a basic CDC 7639/819 controller and disk drive subsystem is $180,000. It is available now.

Control Data Corp., Box O, Minneapolis, MN 55440.
(612) 853-4656.

CIRCLE NO. 103

One card microprocessor for control functions

The PLS-401A is a card-mounted 4004 microprocessor-based logic processor system for use in dedicated control and data processing. The PLS-401A is a one card system. It includes a microprocessor; crystal controlled clock; and an 80-character RAM with 320-character capacity; and external power-on reset. It has 16 TTL input lines, 16 TTL output lines and 4 MOS output lines. Instruction cycle times are 11.20 microseconds. The system is priced at $99 in quantities of 500 and up, and is available now.

Pro-Log Corp., 852 Airport Rd., Monterey, CA 93940.
(408) 372-4593.

CIRCLE NO. 104

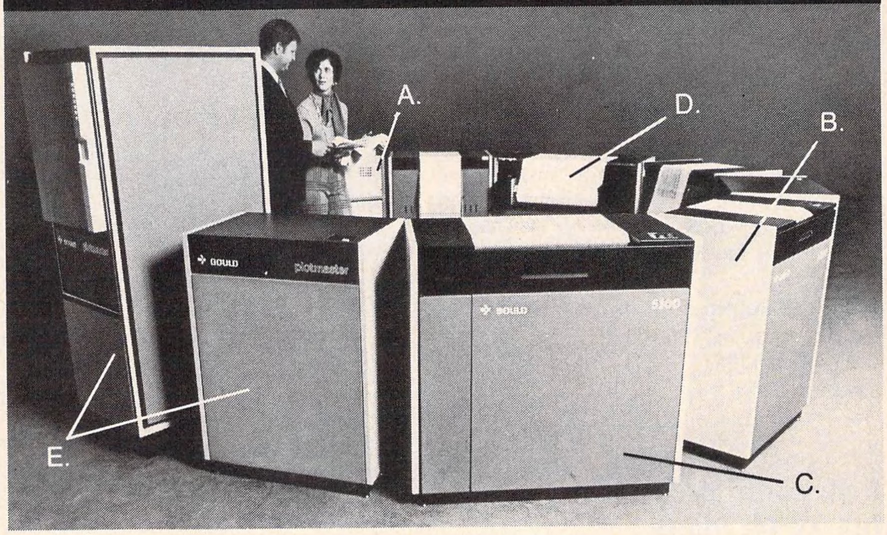
Text editing system run by three microprocessors

This text editing terminal system provides high speed text processing and word wraparound capability. Up to 12k bytes of memory are available as a working buffer. The unit is controlled by three microprocessors: a central processor unit which allows the system to be programmed by the user for any application such as editorial processing, text editing and typesetting; the display microprocessor that provides a movable window in memory and performs all display functions; and an I/O microprocessor which simultaneously manages four high speed devices. A basic text editing system is priced at $2,325 in 100 quantities. Available now.

Ontel Corp., 3 Fairchild Ct., Plainview, NY 11803.
(516) 822-7800.

CIRCLE NO. 105

Gould electrostatic printer/plotters. There's one that fits your application.



A. 4800 Systems—About 800 times faster than drum or pen plotters. Graphs, charts, drawings and alphanumerics.
B. 5000 Systems—Especially useful for mini-computers in general printing/plotting as well as many specialized graphic applications.
C. 5100 Systems—Paper that's 22 inches wide. 400 times faster than any drum or pen plotter—For high speed output of up to D size drawings.
D. 5200 Systems—Staggered head with high resolution of 200 dots per inch. Paper width of 11 inches.
E. Plotmaster Systems—Powerful hardware and versatile software adds fast, efficient engineering, scientific and business graphics plotting to your IBM System/360/370.

Gould's software packages include PLOT, FASTDRAW,™ DISPLAY,™ DADS and printing for a wide range of applications. Direct on-line DMA interfaces are available for most mini-computers, as well as for CDC 3000/6000, Univac 1100 series, and IBM 360/370 computers.

There are Standard and Translucent grades of dielectric paper for all Gould electrostatic units. Our Data Plus grade is available for Gould Series 5000 and 5100 Systems and is designed as an economy output paper for alphanumeric printing and simple plotting.

Write Gould Inc., Instrument Systems Division, 3631 Perkins Avenue, Cleveland, Ohio 44114 U.S.A., or Gould Allco S.A., 57 rue St. Sauveur, 91160 Ballainvilliers, France.

In the U.S. phone toll free (800) 648-4990 for a full line brochure.

GOULD

INFORMATION RETRIEVAL NUMBER 53

Programmable alphanumeric ticket printer

This ticket printer, model DMTP-5, prints alphanumeric information across the width of a standard multipart ticket. Both horizontal character pitch and vertical line pitch are variable. The print technique is impact dot matrix. Data input is ASCII bit parallel, serial, parallel binary or RS232C. Print rate is approximately 2 lps with a line length of 25 characters. Applications include medical instrumentation, weighing systems, pollution control, airline ticket printing and fuel metering. Price is $263 in 100 lot quantity; delivery is 4 weeks aro.

Practical Automation, Inc., Trap Falls Rd., Shelton, CT 06484.
(203) 929-5381.

CIRCLE NO. 111

Disk controller fits 16-bit minis

The DC-16-C disk controller enables users of 16-bit minis to take advantage of big disk system technology. The controller and one disk drive can store anywhere from 25 to 80 megabytes of data and can transfer this data at byte rates to 1.2 MHz. Up to four disk drives can be directed by a single controller providing users with 12.5 to 160 million 16-bit words of storage capacity. The controller has a self-contained power supply and fits either into a standard 19-inch rack or the drive cabinet itself. Cost of the controller alone is $4,740 in 50 unit quantities; delivery is 90 days aro.

Telefile Computer Products, Inc., 17131 Daimler St., Irvine, CA 92705.
(714) 557-6660.

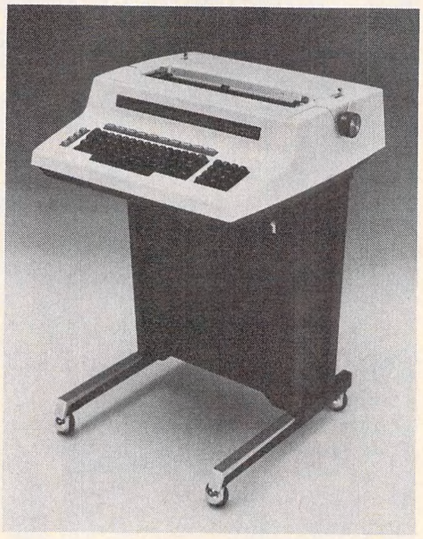
CIRCLE NO. 112

Tape cartridge

The TCP-1000 tape cartridge unit is a complete system for DEC's PDP-11 series of computers. Features include up to 20.5 megabytes of online storage; one to eight drives per controller; 6,000 bps transfer rate; and 120 ips independent rewind. Prices start at $3,195.

Three Phoenix Co., 4747 N. 16th St., Phoenix, AZ 85016.
(602) 277-5431.

CIRCLE NO. 113



Terminal has interchangeable type fonts

Model 300-Q is a 30 cps, wide carriage, impact terminal. It features both interchangeable type fonts and snap in/snap out ribbon cartridges. Ten or twelve pitch printing is switch selectable. The 300-Q may be ordered in a 600 baud configuration, and units in the field operating at 300 baud may be upgraded. Standard features include both horizontal and vertical tabbing, superscripting, subscripting and half-line feed controls. In addition, the Q terminal has an enhanced graphics plotting capability. Priced at $4,500; delivery is two weeks to 30 days aro.

Gen-Com Systems, Inc., 2306 Cotner Ave., Los Angeles, CA 90024.
(213) 478-6087.

CIRCLE NO. 114

Formatted cartridge drive

The DCS-300 data cartridge system combines the DCD-3 data cartridge drive with a power supply and formatter electronics to provide an ANSI/ECMA compatible data system to up to eight drives. A basic system consists of one or two drives, formatter electronics and power supply. A system with two drives costs $3,694.

3M Co., P.O. Box 336000, St. Paul, MN 55133.
(612) 733-9853.

CIRCLE NO. 115

Plotter controller utilizes a microprocessor

The PTC-5 plotter controller utilizes a microprocessor to detect and correct transmission errors and increase the efficiency of the host computer software, without changes in the operating system software. In addition, the microprocessor provides for local generation of alphanumerics, a blocked format circular buffer, compressed plot codes, and compatibility with a wide range of data transmission rates. The PTC-5 accepts data from either an EIA RS-232C type of data source or a teletype 20 ma loop current data source such as a modem or acoustical coupler. Priced at $1,945; delivery is 60 days aro.

Houston Instrument, One Houston Sq., Austin, TX 78753.
(512) 837-2820.

CIRCLE NO. 116

Electronic nonimpact printer prints at 5 lines per second

Model NMP electronic nonimpact printer has a capacity of 20 print columns and prints at 5 lines per second. Its stationary printhead has 100 print electrodes to form the 5 x 7 dot matrix characters. It features noiseless discharge printing, variable character height, compact design and automatic paper insertion. Model NMP offers a wide range of applications for digital and alphanumeric printing. Priced at $60 in oem quantities of 100; available now.

Olympia USA Inc.
Box 22
Somerville, NJ 08876
(201) 722-7000.

CIRCLE NO. 117

Input/output printer

The Tycom model 735 is an I/O printer that utilizes the Tycom baseplate and converts any standard IBM Selectric I or II into an I/O printer. Pin-to-pin compatible with the IBM model 735 I/O writer, this system requires little or no modification. Price is $835 in oem quantities.

Tycom Systems Corp., 26 Just Rd., Fairfield, NJ 07006.
(201) 227-4141.

CIRCLE NO. 118

Magnetic tape controller

The TC-120 magnetic tape controller has the ability to mix 7- and 9-track NRZ, PE or dual-density tape units in any combination up to eight units, and 4-6-6 pack or seven track which allows the user to do core memory dump onto tape. Price is $3,500.
Western Peripherals Corp., 2893 East La Palma, Anaheim, CA 92806.
(714) 630-4310.

CIRCLE NO. 119

Controller links peripherals

The T-7902 Extended Device Subcontroller consists of circuit boards containing cable drivers, receivers and logic functionally identical to the Xerox 7902 device subcontroller. It enables Xerox users to interface non-Xerox peripherals to the I/O processor. Price is $2,226.
Telefile Computer Products, Inc., 17131 Daimler St., Irvine, CA 92705.
(714) 557-6660.

CIRCLE NO. 120

Computerized system manages patients' medical info

The HP 5600A patient data management system is designed to serve hospitals' critical care areas. It is capable of monitoring and collecting data from 32 patients simultaneously while maintaining records of up to 99 patients. A typical HP 5600A system includes a 4.9 Mbyte storage disk, a paper-tape reader and a printer in the computer room; a report terminal and a crt terminal at the central monitoring station; and video monitors, hand-held data-entry keyboards and patient monitoring equipment at patients' bedside. Price of the basic system is $84,000; delivery is 90 days aro.
Hewlett-Packard Co., Medical Electronics Div., 175 Wyman St., Waltham, MA 02154.
(617) 890-6300.

CIRCLE NO. 121

Modules provide 35 million, 70 million bytes of storage

The CDC 889-35 and 892-70 data modules provide 35 million and 70 million bytes of storage for users of the IBM 3340 data module drive. These modules contain disks, spindle, read-write heads and head arms in hard plastic canisters. The moving heads read or write data on disks that provide 35 or 70 megabytes of storage respectively. The CDC 889-35 costs $1,495; the CDC 892-70 is priced at $1,995. Available now.
Control Data Corp., Box O, Minneapolis, MN 55440.
(612) 853-4656.

CIRCLE NO. 122

ATTENTION All Subscribers:

Your next issue of COMPUTER DECISIONS will contain your annual renewal form.

We are revising our mailing procedures and we must ask you to cooperate by filling in the entire form **including** the name and address portion.

In order to guarantee uninterrupted service you **must** complete the form even if you have recently filled one out.

Look for **your** renewal application inside the front cover of the November 1975 issue.

Save time...money...trouble...

Lease your Teletype* equipment from RCA...

Model 33ASR (with tape perforator and reader) **$59** per month**

Model 33KSR (send/receive) **$45** per month**

- **Includes nationwide maintenance service by RCA's own technicians.**

****Prices quoted for 1-year lease. Slightly higher for 90-day lease.**

Call or write nearest office: RCA Service Company
A Division of RCA, Technical Services

Bldg. 204-2
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Phone: (609) 779-4129

3310 South 20th Street
Philadelphia, Pa. 19145
Phone: (215) HO 7-3300

755 Selig Drive, S.W.
Suite F
Atlanta, Ga. 30336
Phone: (404) 696-1616

20338 Progress Drive
Strongsville, Ohio 44136
Phone: (216) 238-9555

43 Edward J. Hart Rd.
Liberty Industrial Park
Jersey City, N.J. 07305
Phone: (201) 451-2222 (N.J.)
(212) 267-1550 (N.Y.)

7620 Gross Point Road
Skokie, Ill. 60076
Phone: (312) 965-7550

2711 Irving Blvd.
Dallas, Texas 75207
Phone: (214) ME 1-8770

1501 Beach Street
Montebello, Calif. 90640
Phone: (213) 685-3069

RCA

* Registered trademark of Teletype Corp.

INFORMATION RETRIEVAL NUMBER 55

Software keeps track of disk file usage

MAPDISK allows users of IBM *DOS* and *DOS/VS* to get an easy to read, snapshot picture of their disk pack utilization. It shows file locations by cylinder and track, type of file, if file is expired (by year only), and additional *ISAM* information such as record size, blocksize, location of last prime data record, and tells which free areas are available. Core usage depends on the number of files on each pack. When 100 files are on one pack it requires 17k. *MAPDISK* costs $195 and is available on a free trial.

Computer Concepts, Inc., 6443 S.W. Beaverton H'wy, Suite 410, Portland, OR 97225.
(503) 297-4721.

CIRCLE NO. 128

Storage protection and debugging system

CICS STOP Storage Protection and Debugging System is now available for installations running the entry version of IBM's *Customer Information Control System (CICS).* It provides the *CICS* entry user with the capability to test new on-going programs and not affect storage external to the task being tested. *STOP* requires approximately 5k of memory and is priced at $4,000.

Software Module Marketing, 1007 7th St., Sacramento, CA 95814.
(916) 441-7234.

CIRCLE NO. 129

Conversational, timesharing DOS/VS system

IDOS/VS is a timesharing system that gives *DOS/VS* users the ability to create, execute and debug *DOS/VS* programs in a conversational, timesharing environment. Batch and interactive are two methods available for the execution of *DOS* programs under the *IDOS/VS* system. The *IDOS/VS* system requires no modifications to *CMS* for installation. *IDOS/VS* is priced at $15,000.

Standard Data Corp., 1540 Broadway, New York, NY 10036.
(212) 586-3100.

CIRCLE NO. 130

Package saves, restores or copies data

Developed by Generic Systems, Inc., *DCRABS (Disk Copy Restore and Backup Systems)* speeds and simplifies the tasks which now permit the user of an IBM 360/370 operating under *DOS* or *DOS/VS* to save/restore between tape and disk units and to copy between disk units. *DCRABS* saves, restores or copies entire or just-active portions of a disk. It also saves, restores or copies logical disk files and all *DOS* Libraries. All libraries are automatically condensed upon being restored or copied. Purchase price of *DCRABS* is $1,500.

Real-Time Computer Systems, Inc., 3720 Main St., Bridgeport, CT 06606.
(203) 372-6621.

CIRCLE NO. 131

Covered with mud, dropped off a desk, and working like a champ.

Our 300 is a 30 CPS, portable terminal that operates over regular telephone lines. It's lightweight, compact, and a joy to work with.

It's also the most reliable terminal of its kind ever built. By anyone.

Ask a salesman who leased a 300 from us about a year ago. He dropped his unit off a desk during transmission, creating a shock that was probably harder on our friend than our machine. The 300 lost two characters, then continued operating as before.

Seemingly determined to destroy our unit, this same fellow then put this same 300 into the trunk of his car. An unscheduled rainstorm filled his trunk with muddy water, giving our machine a thorough bath, not to mention a perfectly good excuse for never working again.

The 300 came through with shining, if somewhat muddy, colors. Plugged in, it operated beautifully.

If you'd like to know more about a terminal that can stand up in this tough world, get in touch with Charles Kaplan or Shirley Newman at (201) 261-6800. Computer Transceiver Systems, Inc., East 66 Midland Ave., Paramus, New Jersey 07652.

CTSI

Execuport 300 portable terminal.
Not just reliable. Practically unstoppable.

◄ INFORMATION RETRIEVAL NUMBER 56

Remote system has 32,768-byte memory

The B 776 System and Communications Processor is a remote communication system whose applications include communication network control, data collection, line and terminal data concentration, and store and forward message switching. It incorporates an operating system called the *Communications Control Program (CCP)* which controls the priority and scheduling of the message processing program and the application programs. The B 776 features a modular, integrated circuit user memory which can range in size from 8,192 bytes to 65,536 bytes. In addition, a 32,768-byte control memory is included which houses the system interpreters and the *CCP*. A typical system costs $68,230 and is available now.

Burroughs Corp., Second Ave. at Burroughs, Detroit, MI 48232.
(313) 972-7083.

CIRCLE NO. 138

Teleprinter offers two-speed switchable wpm

The Extel Series AF receiver-only teleprinter offers five-level Baudot coding (two-speed switchable—75 or 100 wpm). The teleprinter needs no ribbon because it prints on pressure-sensitive paper that can make up to three copies. Printing is done by means of a 5 x 7 dot matrix. Available on lease arrangements, including service, at $55 per month on a one-year lease; available for immediate delivery.

RCA Service Co., Bldg. 204-2, Cherry Hill Offices, Camden, NJ 08101.
(609) 779-4129.

CIRCLE NO. 139

Portable terminal

Model 110 portable terminal provides computer accessibility wherever there is a telephone and a standard electrical outlet. Operating at 30 cps, model 110 features a full ASCII character set, upper and lower case. Purchase price is $3,275.

Tymshare, 10340 Bubb Rd. Cupertino, CA 95014.

CIRCLE NO. 140

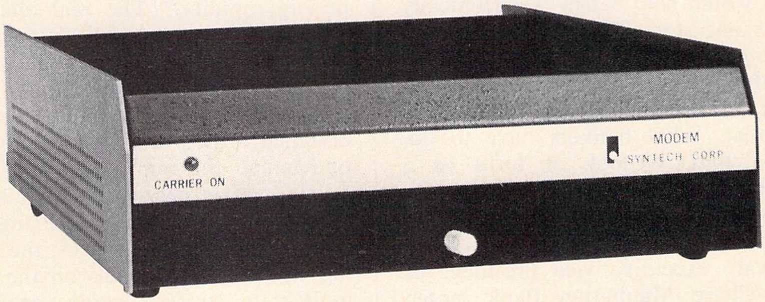
Acoustic coupler

The 400 Series acoustic coupler is designed to allow timesharing and data transmission at 450 baud. It offers acoustic line coupling, RS232 (EIA) interfacing, and full of half duplex. Priced under $250 in oem quantities.

Omnitec Corp., 2405 So. 20th St., Phoenix, AZ 85034.

CIRCLE NO. 141

Bell Compatible



201 A/B/C

Syntech Dependable

Syntech modems are compatible with all Bell System configurations: we operate at 2000 or 2400 bps; on dial-up or dedicated lines; we provide a new-sync feature for polled operation; an answerback tone for auto dial systems. We also have independent carrier and clock settings for performance optimization.

But beyond these features, which are found in practically all competitive products, we offer something truly significant — *an outstanding record for on-line dependability.* Statistical data, based on customer installations and available to you through our Sales Department, demonstrates that our equipment performs, day-after-day, year-after-year.

On-line dependable *Syntech dependable*

SYNTECH CORPORATION
11810 Parklawn Drive, Rockville, Maryland 20852
Telephone: (301) 770-0550

INFORMATION RETRIEVAL NUMBER 57

NEWSDATA . . .

continued from page six

September for the American Bankers Association's Payments System Policy Conference.

The three-day conference, held at San Francisco's posh Fairmont Hotel, focused on consumer needs in the new electronic funds transfer system era. In his opening remarks at the first day's session, T. Robert Faragher sounded off on the consumer theme. Bankers, he said, should "view EFTS from a more healthy perspective—that of serving the consumer."

Other panelists in this opening session also emphasized the customer angle in EFTS banking. Dr. William F. Ford, vice president of the Wells Fargo Bank (San Francisco), claimed EFTS would help banks "electronically move one step closer to the public." Calling the new technology, "a beautiful thing from the customer's viewpoint," Ford warned it could also be a threat. What bankers have to do, he advised, is look at EFTS as a "strategic planning challenge—how do we get through all this profitably."

Another session speaker, Barry F. Sullivan, executive vice president of The Chase Manhattan Bank, noted that while a bank's view of customers may be changing, the customers themselves aren't changing "their ways as fast as technology is changing." In order to cater to customer requirements, Sullivan offered four recommendations on the positioning of banking services: develop a data communications capability; be active in standards development; implement a bank-wide EFTS development strategy; and perform a location assessment.

It worms the heart

The conference's overall theme—EFTS: The Emerging Reality——was picked up by Richard D. Hill in his welcoming address. Hill, who is chairman of the board of The First National Bank of Boston, called EFTS "a can of worms. In the rapidly changing EFTS environment . . . electronic banking is becoming a reality with surprising rapidity." The real challenge for bankers, he stressed, "is to understand the positive effects of today's EFTS decisions."

The conference featured six sessions designed to help the banking big-wigs understand the ramifications of these crucial EFTS decisions. In addition to the initial session on changes in consumer financial services, the meeting also included panels on the ABA's multi-state strategy study, economic implications of EFTS, case studies, catalysts for change, and another on consumer questions.

In the final session on catalysts for change, Russell C. Browne, an advisor for payment systems to the Comptroller of the Currency, summed up the latest EFTS happenings in the regulatory arena. He indicated that the Comptroller would appeal the decision made last summer which overturned his ruling that declared electronic banking terminals were not branches. The Comptroller's office is now in the second stages of the appeal process on the suit and Browne said they "may take the case to the Supreme Court."

Browne claimed the litigation would take two years "for a clearly defined legal outcome in the courts." In the meantime, he urged the bankers to view EFTS on an experimental basis. "There's no electronic magic that's going to make customers flock to banks offering EFT services." Bankers, he insisted, must first "learn how to manage and control this technology to provide maximum benefits for the public."

Mainframe plans go up in a puff of smoke

Tobacco is a state monoply in several countries in Europe, but in none quite so obviously as France. Until 1926, the rationale behind this was totally explicit—distribution of cigarettes, cigars and pipe tobacco was handled directly by the French equivalent of the IRS. And quite rightly, too, with 63 percent of the cost of a pack of Gauloises going to the Treasury.

As economic gloom gathered over prewar Europe, however, the French found it expedient not to mention to just what extent the state benefited from the national opiate. So SEITA was formed, a state-owned company which handled tobacco from the manufacturing stage on.

The distribution network SEITA inherited was a shambles. Each of the country's 350 taxation sub-prefectures had its own depot from which retailers collected their supplies as needed. The depots were fed by a network of 20 widespread factories. The whole system was loosely controlled from a Paris headquarters.

Cutting down

SEITA's first—and until lately abiding—obsession was to reduce the total number of wholesale outlets and concentrate administrative tasks in Paris, where a tight control could be exercised over the whole distribution behemoth. By 1961, for instance, the 20 factories had become large region-

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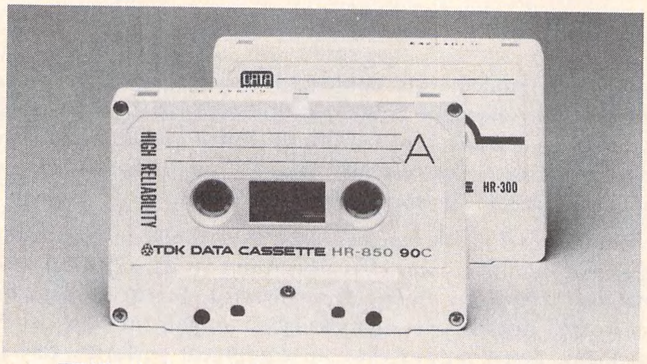

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Tobacco, rowed, or, butt joint

al depots as well, carrying stocks of all French tobacco products and imported lines.

These were backed up by the smaller, local depots, by then reduced to 150—a number that SEITA believed to be the optimum. At the same time, a marketing policy had been developed for the first time in SEITA's history. Instead of retailers coming to the factories to stock up, SEITA representatives started visiting them by van on a regular fortnightly or monthly basis, leaving a new delivery of cartons and collecting payment for the previous load.

Administration had become totally centralized in Paris, where all accounting was carried out. The system was efficient, but it was cumbersome. Stock control was difficult with such a dispersed network, and there was always fragmentation of lots. The invoicing/payment cycle was slow and feedback was haphazard, which hindered forecasting.

Exhaling

So SEITA suddenly decided to reverse its centralization policy. It has ordered 52 Singer 1500 intelligent terminals for its regional offices—a mix of basic 1501s and disk-based 1503s—and intends to devolve all its financial and related applications to regional level. The factories will most likely be equipped with 1503s, since their workload includes production control and accounting for 40,000 small tobacco growers in the south of France.

SEITA's 12 sales centers will have 8k 1501s with high-speed 1551 printers, and the larger local warehouses will have similar installations but with the slower 1525 printer. The sales centers will be linked online to a 4800-baud transmission network for communication with the factories and with Paris. Localized installations will work offline.

All invoicing for the 50,000 retailers will be handled from the sales centers, which will also print out delivery notes for the use of local representatives. Accounting and stock control (but not invoicing) for exports will also be handled by those sales offices that handle cross-frontier deliveries.

A quick puff

Richard Chene, head of SEITA's Informatics Department in Paris, says that the new network will reduce the order cycle from between three and five days to 24 hours, so that late orders and additions to orders already placed can be accommodated without disturbing the traditional fortnightly or monthly schedule of visits by SEITA salesmen.

What he does not say is that there is a second purpose behind the decentralization—to take the pressure off SEITA's aging Siemens 4004/45 (a replica of the RCA Spectra 7) mainframe. For SEITA has fallen foul of the ill-fated attempts at European computer cooperation.

When Unidata was formed, Siemens took the chance, amid a blare of European cooperative publicity, of handing over its unwieldy French computing subsidiary to French manufacturer CII. But CII subsequently merged with American-controlled Honeywell Bull, and apart from the political embarrassment involved, it was by no means clear who was left with the responsibility for maintaining Siemens systems. Upgrading to the Unidata 7000 range (which is based primarily on Siemens hardware concepts) would be not too difficult technically, but this tripartite partnership also appears to be in decline as a result of the merger, so SEITA has given up its replacement plans as a bad job.

Chene now says that the Siemens 4004/45 will be retained another three years (by which time it will be nine years old), presumably in the hope of divine intervention.

Software pinpoints cause of sea tragedy

A sophisticated software package has pinpointed freak wave conditions that led to the sinking of *Morning Cloud,* the yacht owned by former British Prime Minister Edward Heath, and the death of Heath's godson.

Atkins Research and Development of Epsom, Surrey, England, which studied the case, digitized the coastline and seabed topography in the area of the sinking and used its package *Refrac* for the analysis.

The main cause of the disaster was wave refraction. As a wave travels from deep water to shallow, its speed decreases. It is then refracted and tends to become parallel with the seabed contours. The effect is significant only when the water depth is less than half the wavelength.

Refrac examined this refraction, using the necessary seabed and coastline data, with a grid method that determines the effect at a certain spot of waves coming from a particular direction.

Utilizing data concerning the wind direction, Atkins showed how the wave paths built up into a concentrated area of severe weather. *Morning Cloud's* tragedy was that she was caught very near the center of the severe freak waves. After losing a man overboard, the crew, finding the water

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suddenly calmer, unfortunately went back to the same path, right into the wave buildup again.

Nick Heaf and Simon Skey, who did the analysis, say that these danger spots are predictable and could be marked on charts, as could calmer areas. However, they also point out that despite the sophisticated analysis programs available, the charting would be costly.

British credit agencies must open secret files

Credit reference agencies that keep secret files, whether computerized or manual, may be forced to reveal their information to the people concerned under legislation soon to be introduced in Britain.

Regulations, under the terms of the Consumer Credit Act of 1974, will compel an agency to give an individual a copy of any file maintained about him on his written request.

If a person thinks an entry in his file is incorrect, he can ask the agency to remove or amend it. If this action is not taken, he can ask the agency to put a notice of correction in his file for issue to inquirers.

Should the agency disagree with this alternative, the person concerned or the agency can apply to the Director General of Fair Trading to settle the dispute.

U. K. Computing Center looks for raison d'etre

Two hundred people in search of a role.

That might be an appropriate title for a Theatre of the Absurd production featuring Britain's National Computing Center, but at least this body has a director again. Several months elapsed between the departure of the old, uninspiring Dr. Alex Robinson and the appointment of the new, redoubtable David Firnberg. Some said, unkindly, that this was because no one would take the job, but more likely it was because there was some hard thinking at the Department of Trade and Industry about the desirability of keeping the NCC going at all, dependant as it is on $1.5 million from the government each year.

So the NCC has a new lease on life, but it is no nearer knowing just why it exists. It is not that the center has done nothing praiseworthy. As Firnberg never tires of pointing out, its work in establishing educational curricula for the computer industry has had a value that was more than national, and its promotion of commercially unattractive software projects has been useful, too.

But the NCC was supposed to be much more than just an esoteric research body and seminar organizer. It was supposed to be imbued with crusading spirit, to become a national forum in which manufacturers, users, government and the software industry could get together to hammer out priorities for the regeneration through technology of ailing British industry.

Like all bureaucracies, the NCC has grown too big. It was supposed to get a once-for-all government grant of $1.5 million, which would gradually be replaced by contributions from industrial companies. It was supposed to employ 50 people. Now it employs 200, and its once-for-all grant has become a recurring annual handout. Large manufacturers like IBM and Honeywell, which the government sweet-talked into stumping for the NCC, withdrew from it in the early sixties, believing that it was doing nothing that was in their interests.

From fire and mire

Firnberg has now been entrusted with pulling the center out of the mire. A man with 20 years' experience in the commercial sector of computing, he has the entrepreneurial qualities that the task calls for. Cynics find him a touch too pragmatic—part of his price for rescuing the NCC was a $4,000 hike in salary and a five-year contract in place of the normal three-year agreement. He now has to prove he is worth it.

He got off to a false start with the British computing press by being totally unavailable for two or three months, but since then he has made up for it with a veritable plethora of press conferences at which much pledging was done, but little action revealed. Firnberg has been stressing certain aspects of the NCC's work, emphasizing the center's ability to talk turkey with users outside of any commercial relationship—something that neither manufacturers nor software houses can do. But at the same time he has been dwelling on the independence of the NCC—its ability to speak with a disinterested voice to any sector of the industry.

Chronic anomaly

What British users would probably like best is for the NCC to capitalize on its successful work in education and sort out the chronic problem of qualifications and training. It seems anomalous that in an industry always crying out for more staff, it should be so difficult to get a start. But the plain fact is that there is no universally accepted educational standard for judging individual programmers and analysts. The NCC has done a lot of work in this field. Its Basic Systems Analysis curriculum was a pioneer, and lately it has sponsored the drawing up of a badly needed code of conduct for private computer schools.

The industry sorely needs a series of unambiguous educational criteria. Other bodies have tried, but their special situations have always worked against their efforts. The British Computer Society, for instance, thinks highly of its own criteria for membership, yet these are accused by commercial users of being far too academic.

It is in resolving partisan quarrels like this that the NCC's real value must lie.

Service unsatisfactory, British IBM users say

Users of IBM systems in Britain are dissatisfied with the service and maintenance that IBM is giving them. In a study conducted by the IBM computer users' association recently, a pattern of general discontent became evident.

Nearly half of the 259 questionnaires returned stated that service was not satisfactory, and that there has been little improvement during the past six months.

High on the list of complaints was the low standard of preventive maintenance. Some 85 percent of users want the standards of maintenance explicitly defined in their contracts; although customer engineers arrange for maintenance at mutually convenient times, they have a bad record for keeping appointments. Users said reliability was generally good for cpus, disks and control software, but they were less satisfied with card I/O, printers and punch/verify equipment.

Since the survey was carried out, IBM has agreed to try to sort out any complaints with the users' association.

NCR's POS hits Swiss jackpot

Three years ago it was conventional to write off NCR's toe-in-the-water attitude toward POS as unwieldy, too costly and—based as it was on a very limited range of hardware—inflexible. Today the resilient cash register giant is among the top two or three suppliers, has extended its product range enormously and launched a marketing drive with impressive results in Europe.

Probably the most impressive is Glattzentrum, a huge, hideous and extravagantly successful under-cover shopping center just outside Zurich. Glattzentrum is such a threat to the survival of small shopkeepers and to the local environment that the Swiss government is working on hasty legislation to ban any similar developments.

In the meantime NCR has acquired a shrine to its phenomenal recovery in the POS stakes: about 80 percent of all checkout systems in the Glattzentrum were supplied by the American company. As a tribute, NCR has moved its own Swiss headquarters into the center's tower block.

Europe's largest

Glattzentrum, which occupies 52,000 square meters, making it indisputably Europe's largest shopping center, was the brainchild of three leading Swiss department store groups —Migros, Jelmoli and Globus. They have the largest segments of Glattzentrum, Migros having five sales floors and a basement supermarket, but the complex includes everything from first-class restaurants to market-stall fruit and flower sellers.

Both Migros and Jelmoli opted for NCR POS equipment, but Globus went instead for Swiss-made Anker terminals linked to that manufacturer's Moduflex processors. The Migros installation is NCR's most advanced in Europe. It consists of model 255 terminals distributed throughout the store and linked to a model 726 POS processor, a variant of the 399 VRC.

Ironically, not one of the 47 sales terminals is in the supermarket itself, although the 255 is normally found in supermarket environments. Food shoppers take an escalator up one floor and pay at a general-purpose sales point.

Just desserts

The Migros installation has been a godsend to NCR, which never tires of taking potential customers on junkets to Glattzentrum. The Swiss are a decidedly prestige-minded lot, and any manufacturer that captures an august client like CERN in Geneva or Migros for that matter can count on having a field day in Switzerland. The converse is also true; ICL's failure to satisfactorily install five 1900 mainframes for Migros and the subsequent litigation blighted the British company's cause for a decade.

But NCR can justifiably claim to have been highly successful, with Europe-wide effects. The Glattzentrum achievement has stimulated two large-scale market orders in the U.K. and four more in Switzerland: at Swissair's duty-free shop in Zurich airport, the Jumbo Hypermarket in

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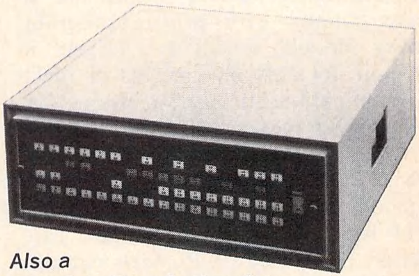

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Discrimination lessens in U. K. computer biz

Employers in the computing sector are apt to regard themselves as among Britain's most enlightened. High on the list of achievements for which they pride themselves is equality of opportunity for women and racial minorities, and equality of pay between the sexes—the latter principle now embodied in a law that will take effect at the end of the year.

Lately, however, disturbing contradictions have come to light about the true position of British dp women and blacks. The latter have an even harder time than women in this supposedly enlightened industry.

The U. K. Race Relations Board, which monitors discrimination among employers, pooh-poohs this widely held opinion. It says that "there was considerable indication three or four years ago of widespread discrimination in color in the computer industry," but concludes that "since then, things have improved."

Part of the credit for this undeniable improvement must go to Fullemploy Ltd., a nonprofit employment agency that specializes in finding employment for blacks. Backed by a clutch of major financial houses, Fullemploy placed 130 people with computer users in 1974 (but only 14 of them were responsible professional positions), and reports "lots of helpful advice" from the British taxpayers' very own manufacturer, ICL, though less response from the American-owned manufacturers.

Fullemploy advises people not to take courses with private programming schools, which are suspect in Britain not only on grounds of racial discrimination but also on the quality of training they provide.

Control Data, for example, has come under fire for the policy of its school, Control Data Institute, which still warns all "non-Caucasian" students that they will have trouble finding jobs. Nonetheless, CDI placed 20 out of 25 blacks it trained last year—an upturn from a few years ago, when it was reluctant to accept nonwhites at all.

ICL's reportedly more positive attitude is no accident. African countries, India, Pakistan, Shri Lanka and parts of the Caribbean are the main targets of the company's sales effort, so it has more of a vested interest in currying favor with non-Caucasians that most other manufacturers have.

The fickle fate of fingers

Scotland Yard plans fingerprint automation

The Metropolitan Police Force in London is planning to automate its fingerprint handling department. In late 1976, the manual indexing system will be replaced by a $2 million computer and microfilm system which New Scotland Yard has ordered from the American Ampex Corporation.

The fingerprint section at the Yard answers inquiries from all over the world. With 3.5 million sets of prints on file, it has found it increasingly difficult to manage with just a manual system.

Once the Ampex equipment has been installed, all fingerprint information will be encoded by police specialists and recorded both on microfilm and as a set of coded characteristics.

Searches for suspects will be made by the National Police computer, which will match characteristics against the fingerprint data base. The result of a search will produce a dozen possible matches, which can be compared manually.

Researchers report robust robot reception

The industrial robot market in Europe is burgeoning, reports Frost & Sullivan, Inc. of New York, and is expected to hit $5 billion by 1985.

More than 30 firms now manufacture robots on the continent, the study states, compared with only four suppliers in 1967. Inroads by industrial robots are expected principally in Germany, France and Italy, where hourly wages have increased by as much as 83 percent in three years, with no halt in sight.

New England bank gets computer phone system

New England's first computerized telephone system is now in operation at the Century Bank and Trust Company in Needham, MA. This is the fourth such stored program telephone switching system and associated individual telephones installed anywhere in the United States, according to Robert Fabbricatore, president of International Business Telephone Inc. of Newton, a regional interconnect company.

The six-year-old Century Bank has installed a Rolm CBX business switch. The system has 16 trunk lines connected to the Bell network, and 68 individual telephones serving nearly 100 employees at five locations.

Unidata collapses as N. V. Philips quits

Unidata, the computer group formed two years ago by Holland's N. V.

Philips, West Germany's Siemens AG and France's CII, is headed for the rocks with the recent announcement by the Dutch company that it was quitting the organization.

The split was not unexpected. Six months ago, the alliance began losing orders for its Unidata computers when rumors of CII's shaky future began spreading. Rumors proved correct, for in May the French government approved the merger of CII with Honeywell Inc.'s Honeywell Bull.

Siemens and CH-Honeywell Bull were to meet to plan future tactics. Spokesmen for the West German firm said the company would continue to produce and market the Unidata line in that country.

Old Fashion Foods gets modern online service

Is the vending machine in your office always out of pimento-cheese sandwiches? Has the egg salad on roll an aged-wood taste? That couldn't happen if your coin commissary were serviced by Old Fashion Foods Inc. of Austell, GA.

Old Fashion has taken the guesswork out of the food supply business by going online an hour a day. As fast as you can say "ham-n-cheese," company president Sheldon Smith can tell you how many and what kind of sandwiches were eaten on any day at any of 100 food machine installations throughout metropolitan Atlanta.

Because about 15 percent of the company's $5 million business is in these perishable items, it was faced with a double problem: too many sandwiches in a machine meant the risk of spoilage; too few meant the expense of an extra 40-mile trip to replenish a machine. Either method resulted in higher costs and customer dissatisfaction.

The solution was a computerized inventory and planning service. Old Fashion turned to National CSS Inc., a Norwalk, CT timesharing company, and Price Waterhouse & Co., national accounting firm, for help in planning a program.

Men you need

The company's data for planning production and distribution comes from the daily menu-forms carried by routemen. Each day when the men reload the machines, they note on the form the kind and number of food items that failed to sell. Old Fashion provides daily menu changes over a four-week cycle, and also has a two-day limit for food stored in the machines. Day-old items are sold at a reduced price in a pot-luck column.

Menu-form information is transmitted from the terminal offices to the National CSS computer. The file is updated daily and printouts indicate how many sandwiches were sold on a particular day and how the items on each menu sold.

Controller Joseph C. Hulsey figures that even with the cost of program development, and terminal rental and monthly timesharing charges, more than $10,000 is saved annually in food and labor expenses. More important, the system permits Old Fashion Foods to meet its commitment to offer fresh vended products.

Data comm manager wins calculator

Nancy Ricciardi, communications manager for SEI Corp., has won a TI-1500 calculator. Ms. Ricciadi completed the June COM survey questionnaire. SEI is a Wayne, PA company that sells online trust accounting services to banks.

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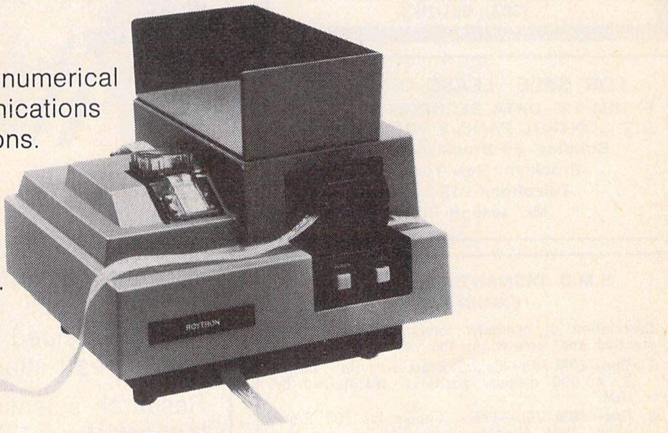

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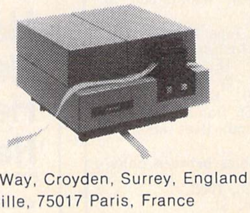

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4. **One—IBM 734**—Magnetic Drum Storage Unit, 60,000 character positions. Maintained by IBM.
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6. **Two—IBM 777**—Tape Record Coordinators (Controllers for Tape Drives). Maintained by IBM.
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Control Data Corporation 11
D.P.F. Incorporated ....Cover II
Data General Corporation 3, 47
Digi-Log Systems Inc. 27
Eastman Kodak Company 13
Facit-Ohdner, Inc. 16I
General Automation, Inc. 4, 5
Gould Instrument System 53
Hayden Book Company, Inc. 45
Infotron Systems ....Cover III
Intel Corporation 17
Intertel Inc. 39
Olivetti Corp. of America 7
Ontel Corp. 16J
RCA Service 55
Raytheon Data Systems 21
Raytheon Service Co. 9
Software International 15
Sweda International (Div. Litton Industries) 62
Sycor, Inc. 22, 23
Systems Engineering Labs....16A, B, C, D, E, F, G, H
Syntech Corp. 57
TDK Electronics 58
Tele-Dynamics, Division of Ambac 37
Teletype Corporation ....Cover IV
Transcom Inc. 41
Wabash Tape 35

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COMPUTER DECISIONS' MODEM/MULTIPLEXER SURVEY

WIN A CALCULATOR!

To enter our drawing for a TI-1500 calculator, please fill out this card completely. You must use a pencil — we suggest a soft pencil — and fill in the boxes completely. Incomplete or improperly marked cards cannot be eligible for the drawing! Your company's planned Modem & multiplexer purchases. Win a calculator! Card must be returned by Jan. 1, 1976.

Plan to purchase __________ (no.) Modems __________ months
Plan to purchase __________ (no.) Multiplexers __________ months

Proposed application:

- ☐ Inquiry/response
- ☐ Data entry
- ☐ Credit authorization
- ☐ Order entry/inventory
- ☐ Other: __________
- ☐ Timesharing
- ☐ Education
- ☐ Text processing
- ☐ Graphics

Communication facility:

- ☐ Dial-up
- ☐ Leased-line
- ☐ Computer mainframe type: __________
- ☐ Other: __________

Transmission mode:

☐ Simplex ☐ Half-duplex ☐ Full-duplex

Line conditioning:

☐ C-1 ☐ C-2 ☐ C-4 ☐ Other: __________

Modem features:

- ☐ Automatic answer
- ☐ Answer-only
- ☐ Originate-only
- ☐ Answer/originate
- ☐ Other: __________
- ☐ Reverse channel
- ☐ Alternate voice/data
- ☐ Integral handset

No. lines multiplexed: __________
Multiplexer speed desired: __________

Synchronization:

☐ Asynch ☐ Bisynch ☐ Synch

Data format:

☐ Serial ☐ Parallel

Diagnostics needed:

- ☐ Alarms
- ☐ Loopback
- ☐ Metering
- ☐ Error counter
- ☐ Carrier detect
- ☐ Others: __________

Multiplexer type:

- ☐ TDM-bit
- ☐ TDM-char
- ☐ FDM
- ☐ TDM-hybrid

Network features:

- ☐ Multidrop
- ☐ Contention
- ☐ Waystation
- ☐ Point-to-point

System will be:

☐ Purchased ☐ Leased

Number of terminals currently in use: __________

Name: __________
Title: __________
Company: __________
Address. __________
__________ Zip: __________
Phone: __________

Please indicate your primary area of activity:

- ☐ USER of computing and data equipment.
- ☐ MANUFACTURER of computing or data processing equipment.
- ☐ SYSTEMS INTEGRATION: acquire edp hardware and subsystems for resale after incorporation into products.

Transmission speeds:

- ☐ up to 150 bps
- ☐ 300 bps
- ☐ 1200 bps
- ☐ 2400 bps
- ☐ 3600 bps
- ☐ 4800 bps
- ☐ 9600 bps
- ☐ 14.4 kbps
- ☐ 19.2 kbps
- ☐ 50 kbps and over

Classification of Business:

- ☐ Manufacturing-Computers
- ☐ Data Processing Services
- ☐ Other Manufacturing
- ☐ Government
- ☐ Educational
- ☐ Finance
- ☐ Trade
- ☐ Medical & Legal
- ☐ Transportation Services
- ☐ Construction, Mining & Agriculture
- ☐ Utilities
- ☐ Other: __________

Division & Position:

- ☐ Company Management
- Computer/Systems Operations
  - ☐ Management
  - ☐ Supervisory
  - ☐ Staff
- Manufacturing/Engineering
  - ☐ Management
  - ☐ Staff

Geographical Location:

- ☐ New England
- ☐ Mid Atlantic
- ☐ Southern
- ☐ Central
- ☐ Western

We would like to receive information from manufacturers: ☐ Yes ☐ No

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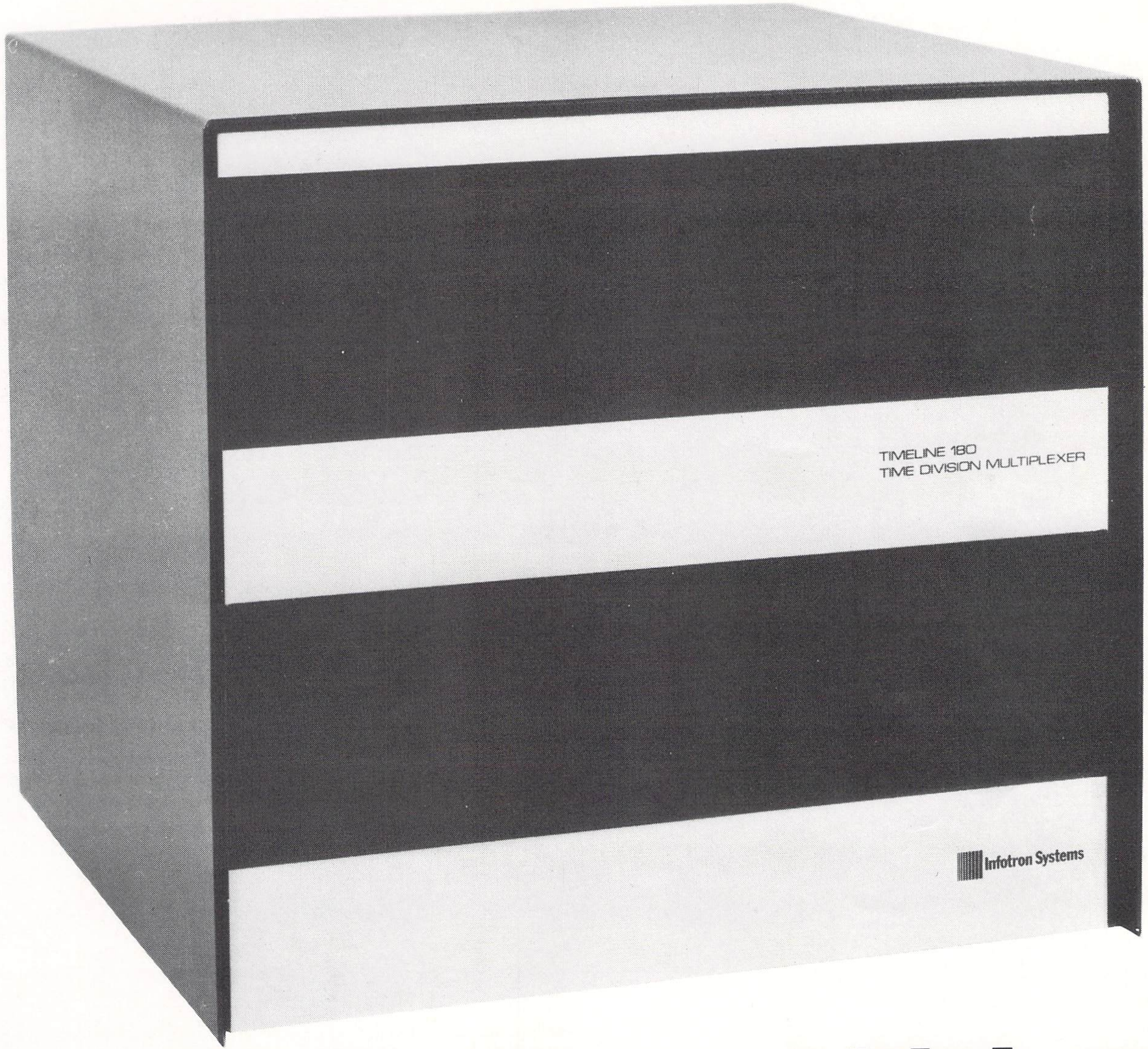

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